

MOTOR AGE

Volume XXXVIII
Number 17

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Detroit, Michigan

(H-11)

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A product that has a year round sale. Takes up little space on the shelf, cannot deteriorate and gives no trouble in handling. Every driver of an automobile is interested in this handy, inexpensive method of restoring the fresh, new finish to his top and cushions if his attention is directed to it.

Dutch Brand Auto Top and Cushion Coating gives a black, elastic, waterproof finish like new. Applied with a brush—dries quickly. For pantasote, leather or mohair.

This is the season when motorists go over their tops and cushions to renew their original freshness after having been subjected to the wearing effects of sun, wind and rain.

Your Jobber Can Supply You

Write for a Dutch Brand catalog describing the entire line of tire and chemical necessities for the motorist.

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Chicago, Ill.

Other Dutch Brand Products

Radiator-Seal Compound
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Cement
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Gasket Shellac Solution
Varni-Rite
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Visit us at the shows in Chicago; Cycle Show, November 9 to 12, Automobile Accessories, November 15 to 20, both at the Coliseum. The Dutch Girl will be there to greet you.

Velie

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Velie Prices have always been accurately indicative of a real intrinsic value in automobile construction. Never has the Velie been overpriced due to an exceptional demand. Never has Velie exacted more than a deserved and living profit.

No thinking person will for a moment contend that an honestly made, fairly priced automobile has become less valuable today that it was a few days ago—but to aid in the pre-war price movement, Velie has thrown all profits to the wind and will take a sharp loss on every car sold at the following prices:

Velie Six—Model 34, new price, \$1385

In addition to a cut of \$200.00, the car is equipped with cord tires, giving the greatest value in the Light Six field today.

Velie Six—Model 48, new price, \$1885

Here at its new price you are offered the very latest in body design and the most desirable of all motor car units.

Comparisons Will Tell the Story

It goes without saying that these prices cannot hold unless Velie is enabled to replace the present costly inventory with new material at lower prices.

Here is an opportunity to obtain a high quality Velie Six at a price more attractive than those prevailing elsewhere in the Automobile field. These low prices may be of short duration. Let us demonstrate to you today.

VELIE MOTORS CORPORATION

113 Velie Place

Moline, Illinois

Builders of the Famous Velie Automobiles, Truck and Tractor

MOTOR AGE

On the Job

by
G. REX VOLZ

THAT'S the impression the owner receives when he steps into the Simon Sales Co. service station, Detroit. This building is a model of scientific design and efficient methods



Here Is Presented an Example of One of the Many Chances for the Dealer to Cash in on the Other Fellow's Ideas and Experience. Perhaps There Are Some Methods on These Pages Applicable to Your Business. You Can Tell Best Upon Reading Them

IT hardly is possible to run a small service station on the same basis as a large and well financed institution but there are methods of operation common to both.

We recently had occasion to visit the service station of the Simon Sales Co., Detroit, a service station run on ideal lines and here present to our dealer readers some of the more important factors conducive to rendering efficient profit-making service in the hopes that some

of the things mentioned might be applied wholly or in part to their own service methods.

This service station services only Overland and Willy-Knight cars and at present handles about one hundred jobs a day. It is necessary to keep the cars in motion practically all of the time. This, of course, demands a scientific layout. Last years' figures show that 55 per cent of the Overland cars in the city of Detroit were in this service station at least once.

Main Floor Plan Laid Out for Greatest Efficiency

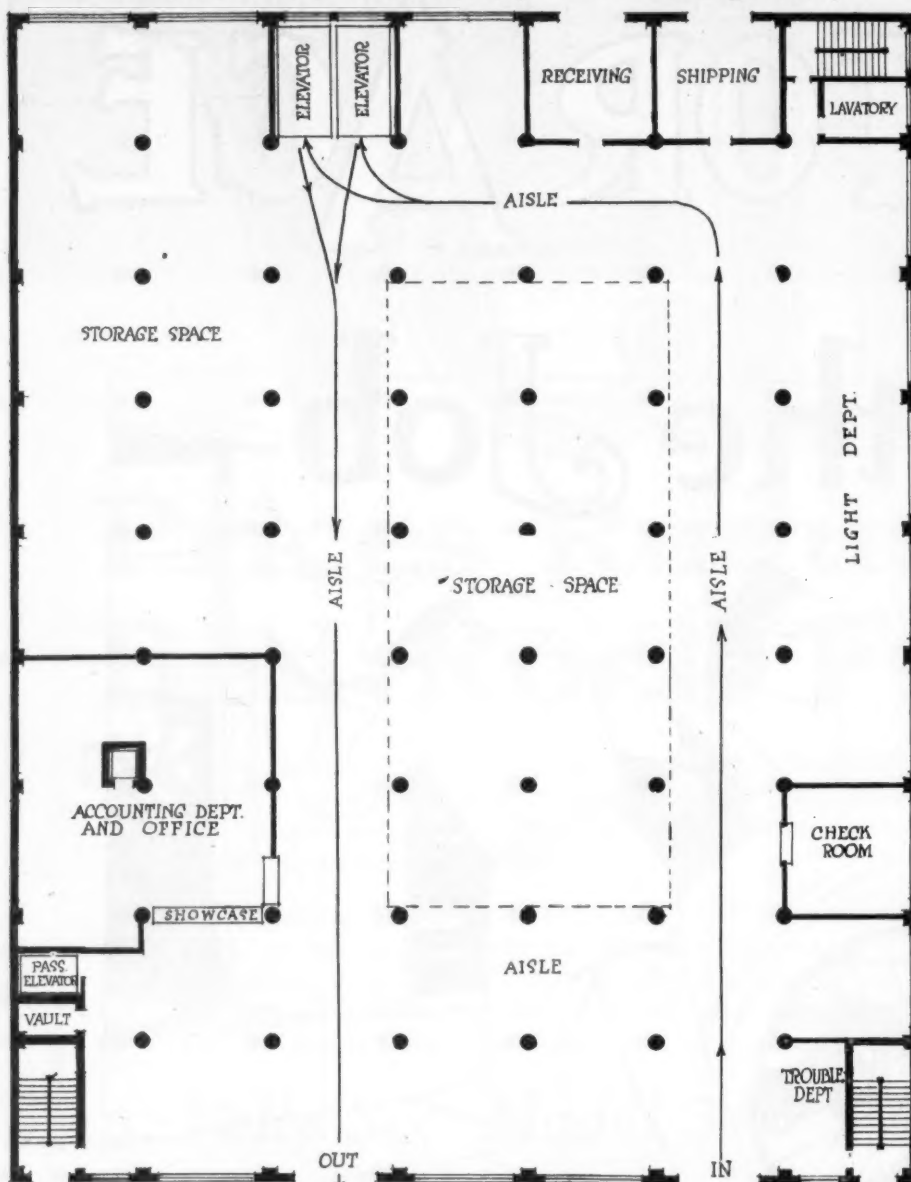


Fig. 1—The approximate location of the principal departments on the main floor of the Simons Sales Co., Detroit. This plan gives a scientific, clean-cut layout that permits handling a large number of service jobs and makes a very favorable impression on anyone entering the service station

Have you ever realized the value of good approach? Upon entering the service station mentioned we were approached by a courteous man from the department at the right which might well be termed the diagnosis department. Mr. G. W. Stroh, service manager, terms this department the "service show case" and considers it the biggest and most important feature of the station.

This is where the service is sold and the impression the owner receives is largely dependent upon the way in which he is approached.

The man who is to fill a position of this kind must create an atmosphere that will make the car owner well assured of the kind of service he will get. Diplomacy in this particular phase of the business is not only highly desirable but absolutely essential because in most cases the

car owner is not in very good humor and according to an old saying, must be handled with gloves. Another essential requirement is to be able to diagnose the trouble, or in other words, be a real mechanic.

Have you ever thought of the importance of neatness and cleanliness? While an owner's car is being examined he can glance over the main floor of the station the layout of which is shown in Fig. 1. Everything is neatly and systematically arranged and the floors are very clean. It seems to exemplify efficiency and further stimulate the thought of the kind of service he is getting.

Have you ever considered the personal property of the car owner? In the Simon Sales Co. the car is driven up the runway about 50 ft. to the checking department. All of the tools, lap robes, etc., are removed and checked. This, of course, is not to create a feeling that one is dealing with looters but to further demonstrate the effort to give perfect service. Tools are easily mislaid or broken. The motto here is, "Use your own tools, not the car owner's, and you will avoid a lot of friction." In spite of how careful one may be the blankets and lap robes will get dirty and soiled and perhaps torn, hence the dealer should take a little precaution and keep the customer satisfied.

Have you ever realized the advantage of a systematic layout of your repair department? After the tools have been checked the car is driven to the elevator and taken to the fourth floor. Here we find the repair work divided into departments. At one side of the building we find the axle and transmission department, at the front of the building the machine department where the special machining jobs are done, then the engine repair and the Knight engine department. At the opposite side of the building is the electrical repair, tool room, and paint department. The center is used for the completed jobs and enough space is left to permit driving the cars around a sort of test rack.

Exterior view of building



From a standpoint of efficiency and the rendering of real service there is nothing more important than a shop layout. By keeping the various phases of the work separated a lot of confusion will be avoided, for the tools and parts will not be mixed so that they cannot be found.

Have you ever thought of the necessity of giving the car a final test to insure keeping your man sold? Suppose the car comes into the shop for axle repair and you find after completing the job that the engine is missing, say, due to poor carburetor adjustment. Will it pay to let the car go out in this condition and give grounds for a complaint although it may be unwarranted when it will take only a few moments of your time to correct it? Very often while working on one part of the car it is found there is some other part that needs considerable attention and on which you cannot afford to give free service. In this case call the owner, explain conditions and make some satisfactory arrangements.

Do you follow up your service to find out if the owner is satisfied with the job? The card shown in Figs. 3 and 4 is used by the Simon Sales Co., in following up their service. It is one of the best ways of determining the faults of your service system. If the job has been unsatisfactory and it is followed with a card you will catch the owner at the psychological moment and he will "shoot it back to you" with a full outline of his complaint. If the job is satisfactory he will probably fail to answer. When complaints are received, call the owner in to have a talk. It is the one big chance to adjust matters and find the faults of the business.

The subject of Service is large and contains varied opinions. Policies and service methods are not applicable to all conditions but there is undoubtedly some feature of every organization that can be incorporated by some one else. Absorb some of the other fellow's ideas for it will help you give good service.

Repair Shop Planned to Handle Jobs in Progressive Order

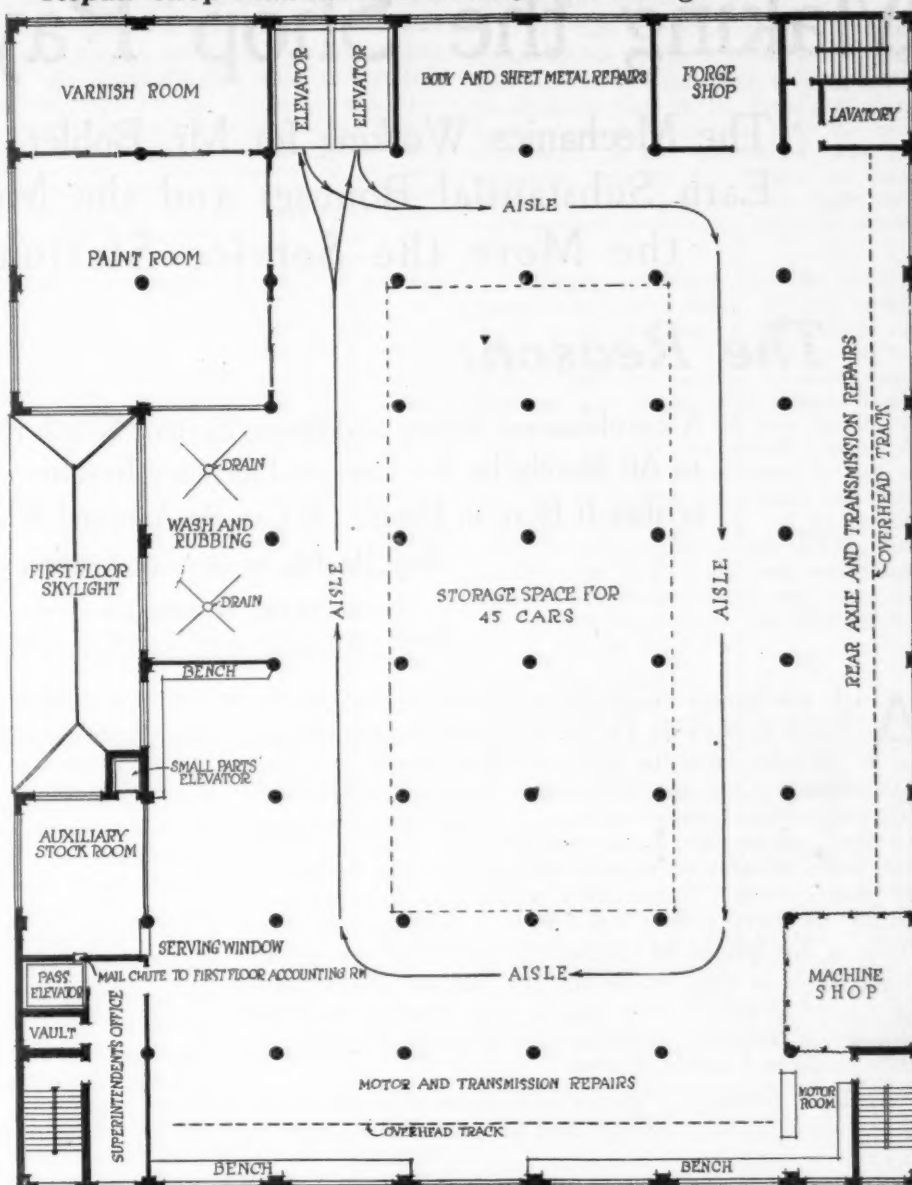


Fig. 2—Floor plan of the repair departments of the Simons Sales Co. A car is routed through this shop in progressive order. In order to speed up the work, a man from any department which will have to work on the car can take measurements or make examination of the car while it is in some other department, but it must not interfere with the work of that department

No Owner Nurses a Grudge in Silence Against the Simons Sales Co.

Detroit, Mich.

We notice from our records that your car was at our service station recently. We will thank you very kindly to fill out the attached card and return it to our general manager.

Any suggestion you may offer will receive consideration, as we are endeavoring to improve the quality of service this company extends to its patrons and with your assistance we believe we can satisfy every patron.

THE SIMONS SALES CO.

Fig. 3

A message that is used to follow up service. It is a means of letting the customer know that you are interested in how he feels about the service he has received

R. A. No. Date

Were you pleased with the work?

Did you ask any information you did not receive?

Did you receive courteous treatment?

Did you like your car?

If not, please state particulars

Sign here

Address

Fig. 4

A card which is stamped and addressed and attached to the card on the left. It represents one of the best methods of finding the faults of your business and correcting them

Making the Shop Pay

The Mechanics Working for Mr. Bohler, Service Manager,
Earn Substantial Bonuses and the More They Make
the More the Service Station Profits

The Reason:

A Combination Salary and Bonus System Which Pays Big Dividends
to All Merely by the Greater Efficiency Resulting. Mr. Bohler De-
scribes It Here in Detail. It Can Be Adopted Whole or in Part by
Any Dealer or Service Station

BY JESSE M. BOHLER

Service Manager for Black & Maffett, Dodge
Brothers Distributors, Atlanta.

ALL mechanics employed in the service station of Black & Maffett, Dodge Brothers distributors, of Atlanta, Georgia, work on what might be called a combination salary and bonus system. This plan appears to have gained more or less publicity throughout the country for I very frequently receive letters from other service managers asking after the details of the plan we use. Naturally I would like to reply personally to every one of the letters I receive, but inasmuch as this would be virtually impossible I am going to set forth in this article the full details of the plan, and I have chosen *MOTOR AGE* because I know that this publication reaches more service managers than any other medium I could choose.

We have found this salary and bonus plan an excellent one and I am confident that the same idea could be

followed to the best advantage by any service station where the management is really desirous of building the shop force to the highest point of efficiency.

IN the first place we engage all of our mechanics on the straight salary basis by the hour and under a nine-hour day schedule. Regardless of what the mechanic may do—that is, whether he loafs on the job part of the time, or works the full time—he is paid for nine hours per day. Naturally, though, we would not keep a mechanic in the shop for any length of time if he should loaf more than we thought necessary. This point is brought out merely to show you that the mechanic receives his salary for the full nine-hour day, and whether or not he earns any more than his regular salary is dependent entirely upon his own ability and his capacity for work.

BASED on the law of averages we have devised a schedule of the time required to complete almost any job that is brought into our shops, and the work of all of our mechanics revolves around this schedule. Each mechanic is required to fill out a card for every job. This is known as a time card and it carries the

workman's number and also his name, the number of that particular job, the date and the exact work that the mechanic performs. The mechanic is also required to write down on this card the exact time of day he started on this job, the time he finished the job and the total number of hours he devoted to it.

Now, then, at the end of each day the clerk in charge of these records will total the number of hours the mechanic actually worked that day. This is taken from the time card which he has filled out, and remember there is one card for each separate job. If the mechanic has not loafed at all during the day this total will be nine hours. Then the clerk will total the scheduled time for each particular job. If the mechanic does in nine hours certain work that our schedule allows twelve hours for, he has gained three hours. However, the following day he might work the full nine hours and turn out work scheduled for only six hours. In that case he will lose the advantage he gained the day before and will stand just even.

Our final totals and our bonus figures are made up at the end of each month. To best illustrate exactly how this plan works let us, for example, take the case of John Smith. We will say, John is an extra good mechanic. At the end of the month we find that John's time cards show he has worked steadily the whole month and has put in, we will say, a full 200 hours. We find that John has turned out a certain number of jobs that our job

TIME CARD

Workman No. Name of Workman

Job No. Date

This is the time card and carries the workman's number and name, the number of the job and the work he is to perform. The mechanic writes on this card the exact time he started and finished. There is a card for each job and all the cards for the day's work are turned in and totalled. The schedule time for all the day's jobs listed by the cards are then totalled and the difference shows whether a bonus is to be paid or not.

Time Started Time Stopped Total Time on This Job Hrs.

time schedule shows we allow 250 hours for. In that case John Smith will receive a bonus check equivalent to fifty hours of work at his regular rate of pay. Suppose that John receives seventy cents per hour; his bonus check for the month will amount to \$35.

On the other hand, let us take the case of Bill Jones. We find that his time cards show he has put in 180 hours in actual work. Evidently he loafed a bit, but regardless of that fact if his cards show he has exceeded the scheduled time we will pay him extra for it. Well, let's see how. In 180 hours we find that Bill has turned out a certain number of jobs and that the total time we allow for these jobs according to our schedule is 201 hours. Inasmuch as the clock time for the full month was 200 hours, Bill is entitled to a bonus equalling one hour's extra pay. In this case it would be sixty cents, for Bill's rate is not as high as that of John Smith who has been with us longer and is a better mechanic. It may be that there wasn't quite enough work in the shop to keep Bill Jones busy the full 200 hours, or it may be that the twenty-hour loss between his time cards and the time clock is due to his own habit of loafing. In either case if he had put in that extra twenty hours in actual work he might have made an extra ten or fifteen dollars.

Careful Check Avoids Mistakes

On account of the fact that each mechanic's time is registered on the clock it is not possible for any of them to cheat, even were they inclined to do so, by incorrectly filling out their cards. We would naturally catch a man at this by comparison of his time card with his clock record. Each mechanic is required to fill out his own cards in his own handwriting.

These individual records are kept in a book that we have devised for this special purpose. The book contains each mechanic's name, his clock number, and space is provided for entering his clock time, card time, idle time and schedule time. These entries are made by the clerk in charge of these records every day, and we can tell at a single glance just how much any particular mechanic is ahead of the game, or behind as the case may be.

Every mechanic's clock time will run nine hours, unless he happens to be off for some reason. His card time should, of course, correspond exactly with his clock time providing he has worked steadily the whole day. If he has not worked steadily the whole day then we enter his idle time under that heading.

Now as to the column for schedule time, perhaps a little further explanation will not come amiss. Every job that comes into our shop is scheduled according to the time it would require an averages. And, furthermore, the customer is charged for the work according to this scheduled time, so you see where we make our gain when the mechanic is able to beat the scheduled time.

On the other hand if the mechanic can-

not beat the scheduled time, but instead takes longer for the work, you can see where this is a loss to us. And naturally we will not keep a mechanic long in our employment who persistently takes longer for the work than the schedule calls for. One of the big advantages of this combination salary and bonus plan is that it gives us at all times the fullest information as to the ability, or lack of it as the case may be, of every mechanic in our shops. And when a man asks for a raise it does not take us a moment to look up his record to find out whether or not he is entitled to it.

Suppose a mechanic turns out three jobs in one day that we allow twelve hours for according to our schedule. Under the column for "Schedule Time" the clerk will write the figure "12." As the mechanic's clock time is nine hours,

DO you know which mechanic is making money for you and which one is carried at a loss? Mr. Bohler, service manager, does. He says it's easy with his plan. Read how!

he has gained three hours that day, and if he keeps on exceeding his clock time this way every day he naturally will draw a good sized bonus check at the end of the month.

An instance is recalled of one mechanic who gained twenty hours on the schedule time the first fifteen days of the month. If he had kept this up the whole month and gained a full forty hours he would have received an extra bonus of \$28, for he was a seventy-cent-per-hour man. However, something or other happened and during the next fifteen days he fell

behind twenty-two hours, so he did not receive any bonus at all.

In the case where a mechanic happens to have a big overhaul job on hand which may require two full days, or even more, he does not turn in the time card until he has fully completed the job. We have had some of our mechanics beat the schedule time by ten hours on these overhaul jobs, while in other cases they took several hours more than the schedule calls for.

We have what we term a clearing house every thirty days. In case certain work is not finished at the end of the month, we check it up and it is carried over to the next month. In some cases this may give the mechanic fifteen hours extra at the start of the new month. It depends upon his own efforts whether or not he will add more hours to this or lose the ground he has gained and draw only his regular salary. If he merely holds even during the month and the final totals show that he has just that fifteen hours to his credit carried over from the last month, he receives that extra fifteen hours' pay as his bonus.

Paid When Work Is Slack

Naturally it is only fair to the employer, and to the employee as well, that when business is more or less dull in the shop and the mechanic has to loaf a part of the time he should not complain because he is not making any extra bonus. He should appreciate the fact that he is being paid while idle according to the clock hours, and this is exactly what we agree to do when we engage a man, although we engage all of our mechanics on the hour rate basis.

Furthermore, we have an agreement with all mechanics that when a job comes back to them, and after our inspector has examined it carefully and decides it is the fault of the workman, the particular mechanic who did the work in the first place will do it over again on his own time. That is, if it requires five hours to do the job over again, this five hours is charged against his bonus. Should he be ahead of the game at the end of the month this five hours is subtracted from the

A Sample of How the Bonus Plan Is Recorded

Following is the manner in which the records are totalled each month, these records being taken direct from the book mentioned in the article and in which they are kept from day to day:

No.	Name	Clock Hours	Card Hours	Idle Hours	Schedule Time	Gain	Loss
1	E. M. Downing	206	164	2	165	0	40
3	C. C. Walker	216	197	10	189	0	9
7	C. D. Randall	207	192	0	325	118	0
17	J. N. Petit	208	217½	0	231	23¾	0

Every month there is posted in the shop the full record of each mechanic who has exceeded the schedule and is entitled to a bonus. Below is a sample of a recent bulletin:

Clock No.	Name	Gain	Rate Per Hr.	Bonus
34	H. E. Schlittler	26¼ hrs.	.80	\$21.00
33	W. A. Posey	64¼ hrs.	.70	45.32
7	C. D. Randall	55¾ hrs.	.80	44.20
3	C. C. Walker	¾ hr.	.60	.45

MR. BOHLER'S whole plan of combination salary and bonus revolves around a schedule time limit for each job. While every service station has not a record of how long each service operation should take, there are some jobs upon which a time limit may be set from previous experience, and the mechanic rewarded with the time he can save under that limit. This will prove an incentive for the workman to improve his efficiency and create an enthusiastic spirit in the organization.

number of hours he may have gained.

In case he is not ahead of the schedule this five hours is charged up against him every succeeding month until such time as he shall beat the schedule when it is subtracted from his gain. Furthermore, no man is entitled to an increase in salary until he has made up through beating the schedule, all time charged against him in the past—that is, all time such as jobs brought back on him, etc. If a man persistently beats the schedule and draws down a substantial bonus each month, as some of our best mechanics do, we are only too glad to raise his salary rate per hour because such men we have found are worth all we pay them.

It is not at all an infrequent occurrence for us to pay a good mechanic a bonus amounting to as high as \$75 to \$100 for a single month. *Naturally we get the full return on this investment for every time the mechanic beats the schedule time that's just so much profit to us.*

Eliminates Outside Work

It has been our experience that a great many mechanics who work on an ordinary salary basis are sometimes apt to augment their income by working on cars on their own time after hours; they will generally do this at the owner's house. We have found that this salary and bonus plan virtually eliminates that practice among our men for if the mechanic is an energetic sort of a chap he can greatly augment his earnings by giving his full time and attention to the work in the shop. And by earning extra money in this way he does not have to augment his salary by giving any of his outside time to individual work.

All bills we send out to customers in addition to carrying an itemized statement of the actual work done, also carry the workman's clock number and the job number. At the end of the month the clerks carefully go over all these bills, check them with the inspector's card which was signed by him as to whether or not the work was satisfactory, and also check them with the workman's time card.

We also send out a card to all customers asking them as to whether or not they were entirely satisfied with the work done in our shops. Any replies that are received are filed with the duplicate bill, and therefore we have a complete check at all times on all work done in the shop as to whether or not it proved entirely satisfactory to the customer.

This checking up is done at the end of the month in order that we may make doubly certain regarding the work of each individual mechanic before we pay him whatever bonus he may have coming.

We also employ in our shop an efficiency man whose sole duties are to go around among the workmen and show them how to do this or that particular job as quickly and efficiently as possible.

When to Install New Piston Rings

THE function of a piston ring is to seal the combustion chamber—keep the oil from escaping upward and the gas from escaping downward past the piston.

When a piston ring fails to do this, it is time for a new ring.

A continuous smoking even after the engine has become hot, loss of power and dirty spark plugs which cause a knock, are usually the first symptoms which are quickly followed by a noticeable reduction in the mileage obtained from the gasoline and lubricating oil.

Because a ring does not satisfactorily block the passage of gas and oil does not necessarily mean that the ring at present in the engine is worn out, for some rings, because of their design, will never function properly whether new or old.

A piston ring should be round and conform to the contour of the cylinder—it should have tension—and equal outward pressure at each point of its periphery—it should fit the piston grooves neatly with just enough play to allow it to float and the ring's wall thickness should be uniformly of such a dimension as to fill the piston grooves without the danger of the ring bottoming on the piston.

An old and now obsolete theory was that a large amount of the leakage past a piston ring was through the joint, but recent tests have exploded this idea and have proven very conclusively that the greatest danger of leakage past a ring, whether new or old, is either around the outside diameter or between the piston ring and the piston groove.

The piston grooves, especially in a high speed engine, are apt to wear, allowing the ring to fit loosely on the piston, even though it may preserve a leakless contact with the cylinder wall, and as soon as this condition arises, the piston

This man is one of the best mechanics we were able to hire and his work is advantageous to us and to the employee as well. Naturally if he can show a mechanic how to do a certain job more quickly it is to that mechanic's advantage for it enables him to beat the schedule; and when he beats the schedule we profit as a result.

As a matter of truth it is distinctly a pleasure to us to pay a mechanic a good large bonus for the larger bonus he makes the more profit he has made for us. We have found that this combination salary and bonus plan keeps every mechanic in the shop going not only at top speed all of the time, but turning out the best work for he knows that he is the one who will have to pay for the job if it comes back. We have raised the shop force to the highest point of efficiency with this plan mainly because we have been able to employ the very best mechanics who realize when they accept a position with us that they are going to be paid according to their own individual ability and that their earnings will depend entirely upon their own efforts.

grooves should be trued up and oversize width piston rings installed.

It is almost impossible to estimate the life of a piston ring because of the exceedingly large number of related conditions to be considered.

Aluminum Pistons

ALUMINUM pistons have been lately developed to the extent of giving, as a component part, equally as good service as a cast iron piston with the added advantage of lightness, which in reciprocating parts, reduces the loss due to inertia.

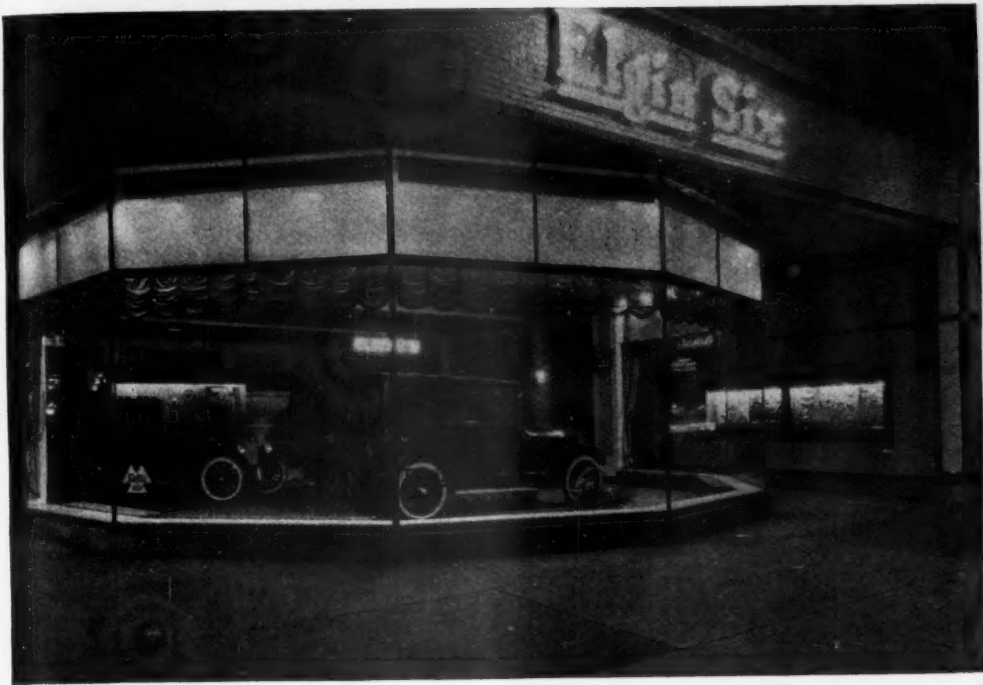
One of the first difficulties of aluminum pistons was their unequal expansion when heated compared to cast iron cylinders under similar heating conditions, but recent developments have proven that the materials and proportions used, at least in some aluminum pistons which are being marketed today, have largely overcome this difficulty, and a high grade aluminum piston equipped with a one-piece ring of uniform and lasting radial tension, should give excellent results.

The question has been brought up as to whether the different expansions of an aluminum piston, a cast iron piston ring, and a cast iron cylinder, due to their respective coefficients of expansion, detracted in any way from the satisfactory functioning of such an assembly. However, we are fully convinced that the differences in expansion between the cast iron and aluminum are so small as to be negligible.

The wearing of cylinders—both tapered and out of round—might be due to a number of causes; for example, a lack of lubricating oil, improperly designed or poorly fitted piston rings, or too much play in the connecting rods or wrist pins, which might allow the sharp edge at the top of the piston to score the cylinder.

A Show Room That Works 24 Hours a Day

Novel Illuminating and Display Features Make Elgin Salesroom of Interest to the Passersby. Many Sales Have Been Traced to Its Attraction



This photograph was taken at night and gives a good idea of how well the display is illuminated. It does not, however, show the colored lights which are the real novelty

TOO much cannot be said in favor of getting our goods before the public in as attractive a manner as possible. There are many methods of displaying goods. We can place them in a window in such a way that if the sun is shining in, someone may possibly see them, or we may have a window that is so favorably located that the passing public cannot escape noticing our display.

To show what can be done with a very ordinary 50 ft. inside location when a little thought is given the subject, we reproduce a photograph of the front of a building recently erected by the Elgin Motor Car Sales Co., in Chicago.

Situated as it is in the center of a block and among dozens of other places on Michigan Avenue, some of them larger and much more elaborate, there was a big danger of its being lost among the "also rans." By using a specially designed front, however, they have not only made it the sensation of the row but have given it features which make it a point of interest to those passing at any hour of the day or night.

As will be seen by the illustration, the front has been, in a way, entirely removed and the wall above supported on a concealed girder. There are entrance doors at either side but they are placed 22 ft. back and have a circular bay of plate glass between them. Thus, while the actual frontage or lot width is only 50 ft. there are two good-sized doorways and more than 60 ft. of plate glass for the display of cars.

Setting the doors back presented another opportunity which has been used to good advantage. The outside walls have been lined with attractive face brick and have glass covered recesses which are utilized for the display of parts, cut-away power plant, etc.

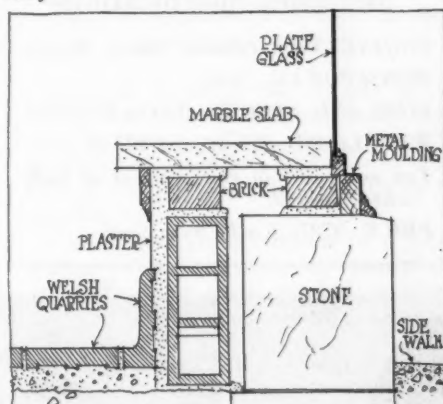
These wall displays are a constant source of interest to the passing public night and day and as Mr. Wehmeier, the general manager says, they create much favorable interest in the Elgin car and do a great deal of good even though many of the curious are not buyers.

At night the show room is more attractive than during the day. While an electric fountain in the back of the show room draws the eye of the observer in that direction, the entire room is alternately flooded with red, green, blue and white light, automatically controlled and operated all during the busy traffic hours of the evening and night. With all the brilliant illumination there is no glare; every lamp is concealed and indirectly subdued.

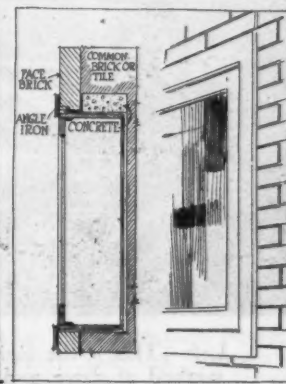
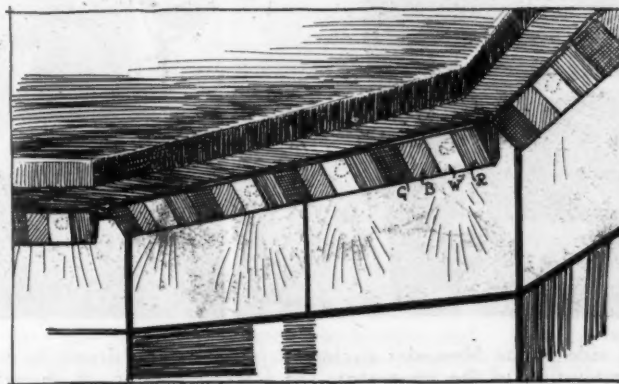
Detailed drawings show the method of obtaining the colored light effects and of constructing the wall displays and window sills.

When a car is displayed as the one in the illustration an observer may walk around it and get a direct view on three sides. It enables people to look the cars over pretty thoroughly and makes Elgin boosters of those who would not go inside for fear of being pounced upon by a salesman who might influence them against their judgment. Wherever they see an educating display of this sort they are eager to study it and the seed of a future sale is often planted.

Many people have this peculiar trait. They like to "window shop" until they are ready to buy, and when the time comes to make a purchase they know just where to go and get what they want.



Detail of the window sill with marble benches inside

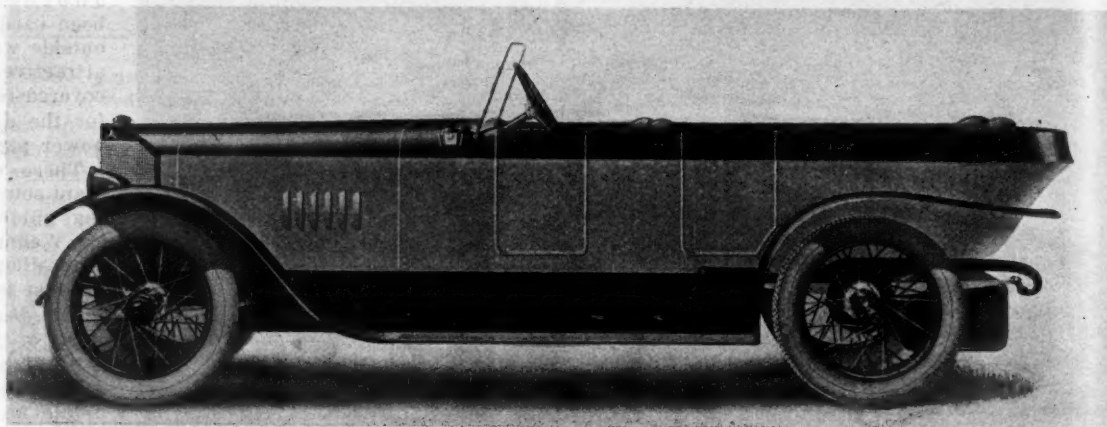


Powerful electric lamps behind colored glass encircle the head of the window inside and automatically flash red, white, blue and green as indicated. At the right is a sketch showing construction of the parts display recesses

The Mercedes—Europe's Latest Offering

First Model Since the War Now on Display in New York.
Powered by Four Cylinder Silent Knight Engine.

Seven passenger Mercedes touring car equipped with wire wheels. The chief feature of interest aside from the striking lines is the concealment of the top in a compartment in the body to the rear of the tonneau seat



THE first Mercedes model to be received into this country since the war is the 16-45 hp. four-cylinder Knight now on exhibition in the showroom of the New York dealer, the Westcott Motor Co.

The engine is a four-cylinder silent Knight with a bore of 3.94 in. and a stroke of 3.12 in. Tires are 34 by 4½ in. and the chassis is made in two wheelbase

lengths, 116 and 128 in., both retailing for \$7875 f. o. b. New York City.

Starting motor and lighting generator are manufactured by the American Bosch Magneto Company. The magneto is of single spark design with provision for running or starting on the battery by a turn of the switch located on the cowl.

LL auxiliary units are driven from gears between the two cylinder pairs. The eccentric shafts themselves are driven by gears between the two cylinders and not at the front as is usual. The generator is mounted on the aluminum crankcase forward to the right. The starting motor is located at the left rear and is reached for inspection or cleaning through a hinged hand hole plate fitted into the mud pan and locked by a snap catch.

An interesting feature is the placing

Mercedes Specifications

ENGINE—Four cylinder Silent Knight.

HORSEPOWER—16-45.

BORE AND STROKE—3.94 in. by 3.12 in.

WHEELBASE—116 in. and 128 in.

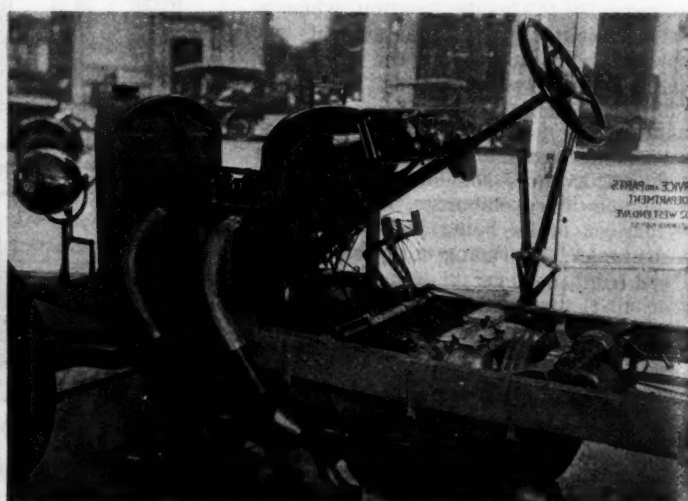
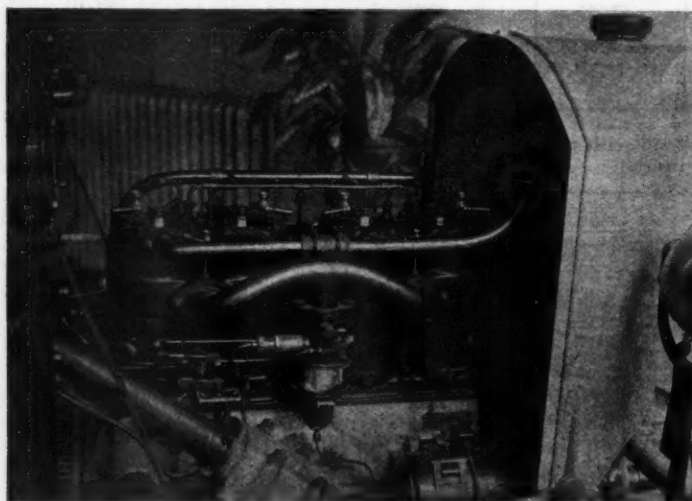
Top concealed in compartment of body when lowered.

PRICE—\$7875 f. o. b. New York.

of the starting motor button on the cowl board. Here also are grouped the lighting and ignition switches, fuses, and ammeter. Lighting and ignition are combined in one switch.

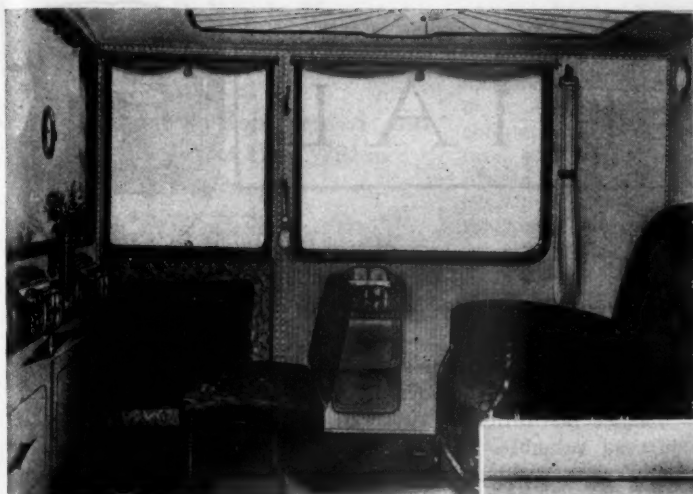
The starting battery is carried in a cradle at the right side to the rear of the gearbox.

The auxiliary oil tank is mounted between the cowl board and the dash. It is oval and holds about 3 gal. Oil is forced from it, to the engine sleeves, the steering gear and the rear axle unit by



Left—This is the right side of the Mercedes engine. It shows: The simplicity and compactness of the carburetor; the method of drive and mounting of the generator; the interconnection of throttle and oil supply, to the rear of the carburetor, and just in front of it three-way handle for ascertaining the oil level and for drainage.

Right—This view shows the expansion chamber on the exhaust line. The auxiliary oil tank between dash and instrument board is worth noting. The hand wheel adjustment on the transmission is convenient.



This Mercedes limousine is suggestive of a drawing room with its flowered upholstery and the use of individual chairs as rear seats



Close-up of open body. The luxurious divided rear seats are perhaps the most conspicuous points of interest. This body is equipped with auxiliary seats

pressing a button pedal on the floor. There are three main oil leads from the pump actuated by this pedal. One runs directly to the ball joint which forms the front end of the torque tube, another runs to the steering gear housing and the third spreads into eight branches which terminate at the head of the sleeve and the side of the sleeve on each cylinder. This simplifies the work of oiling the car. At the same time the ease with which the pedal may be operated makes it an ideal means for lubricating the cylinders during a hard, long pull or continued high speed. Since the universal joint, torque tube and rear axle are practically one unit all the working parts on them are supplied with lubricant through one lead which enters the ball joint housing.

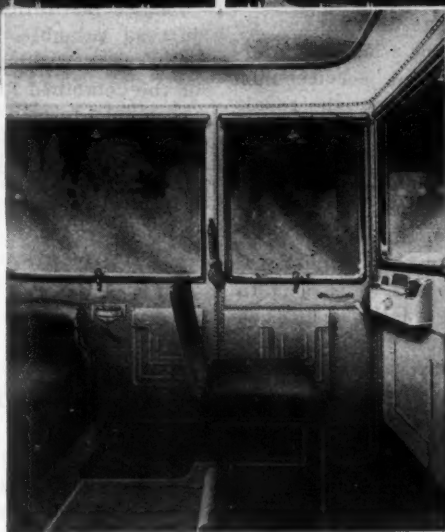
The single bearing on the water pump is lubricated by a grease cup which is conveniently mounted on the instrument board.

The oil level in the engine may be determined by operating a three-way valve just back of the carbureter. This valve makes draining of dirty oil a simple matter since a turn of the handle opens a valve in the base of the crank-case.

Carbureter Has No Adjustments

Spring bolts and similar parts are lubricated by grease cups provided with hexagonal heads so that they may be turned with a socket wrench. This feature makes it possible to insure the delivery of grease to the bearing.

The carbureter is a new design, small and simple. It has no adjustments and consists of little more than an annular float chamber surrounding the intake air opening. The float chamber is fitted with a breather hole which is covered with a fine mesh brass screen. Since the float chamber is completely enclosed the breather is necessary to provide atmospheric pressure therein. A commendable safety feature is found in the shape of an overflow drain from the float chamber. In this design, the hot air pipe



Except for one detail, this Mercedes might be taken for a finely built American car. The exception is the use of a built-in sofa in place of the more usual rear seat

completely encloses the bottom of the carbureter and there is a small drain pipe running from this pipe down through the mud pan so that any overflow of fuel is discharged directly to the ground.

The hot air stove consists of a jacket which encloses the separate exhaust pipe extending from each pair of cylinders. A short branch pipe connects the stove with the carbureter intake, this pipe passing between the cylinders. The carbureter end of this pipe is slotted and there is a rotating slotted sleeve to correspond. Movement of this sleeve regulates the quantity of hot air, the remainder of the air being cold air drawn in through the slots. Regulation of this sleeve is from the instrument board.

Air pressure is supplied to the 28 gal. gasoline tank by a single cylinder air pump mounted at the rear of the concentric shaft on the left side of the motor. There is a simple hand wheel adjustment on the top of the pump for regulating its pressure.

Initial pressure for starting is obtained through the use of a hand pump on the instrument board.

The gearbox is located amidships and has four speeds forward and one reverse. The shafts are mounted on annular ball bearings. A hand hole secured by butterfly nuts is provided for inspection.

The front end of the box is mounted on a cross member and the rear is bolted on each side to an X-shaped trunnion member. The service brake is at the rear of the gearbox and in front of the trunnion support. It is adjusted by a large hand-wheel.

The front of the torque tube terminates in a large ball which encloses the universal. The ball socket is bolted to the trunnion.

The rear axle housing is split vertically through the center and has a hand hole plate on top. The axle housing sleeves are bolted to this steel casting. Triangular braces run from the front end of the torque tube to the axle housing extremities.

Dual bevel gear drive is used, the drive shaft having a bevel pinion front and rear mounted in the axle housing. Each pinion meshes with its own ring gear. The double bevel gear permits the cambering of the rear wheels without the necessity of using universal joints.

Rear brakes are internal expanding. They are equalized by a bevel pinion and two segments, enclosed, and mounted on top of the gearbox. Adjustment of these brakes is obtained through a hand wheel which can be reached through the floorboards in the driver's compartment.

Exhaust Back Pressure Reduced

The exhaust system is noteworthy in that unusual effort has been made to reduce back pressure. Separate exhaust pipes are used for the front and rear pair of cylinders. These pipes break through the side of the hood and are carried straight down below the frame where they enter an expansion chamber. The muffler cutout is located at the rear of this chamber and back of it is the muffler. The exhaust pipe runs along the under side of the frame to the rear of the car.

Looking at the cowl board, the equipment from left to right is: Grease cup to water pump; hand pressure pump for gasoline system; starting button; air gage and oil gage grouped with a light above; ignition switch and ammeter with a light above.



EDITORIAL



MAKING BETTER MECHANICS

IN our discussions with dealers throughout the country we are more and more impressed with the fact that education is a much needed factor in the life of the average mechanic. By that we do not wish the inference drawn that service men must have a college education before they attempt the repair of motor cars, trucks or tractors. Neither is a high school education necessary, but a knowledge of the working parts of the machine is necessary. Nor will this alone do, for the knowledge of construction must be supplemented with the characteristics that follow along with thoroughness.

Two illustrations are presented which forcibly bring home to one the low plane on which our service is now based. In a certain dealer's organization one man was described as being the "crack mechanic." It was the duty of this man to inspect all new cars going out and all new cars which had been in the customer's hands for about a month.

His expertness was relied on to detect faults and prescribe remedies, carburetor adjustments valve adjustments, and the smaller things were left to him to adjust. When asked as to the adjustment for the battery charge he did not know, but made a guess that the cut-out secured to the dash board was the means by which this was accomplished. The existence of a third brush, a shunt field regulator or a special field winding had never been known. In fact the only cure for a run down battery on the customer's cars, occasioned by continued night driving with much stopping and starting, was to change the battery at regular intervals. A simple movement of the third brush would have taken care of the trouble in these various cases, yet it was not done for it was not known.

In the second illustration a mechanic adjusted the valve tappets and failed to tighten the retaining nuts in a thorough manner. The result was that the tappets started to adjust themselves after a short space of driving, which made it a very hard engine to handle. It was found that one valve was hardly opening at all, and another was opening far ahead of its scheduled time.

Now in each of these instances one should not blame the mechanic too harshly. Perhaps in the latter case the mechanic was really the source of the trouble. But if his work is slovenly in fashion then he is not the man for the high-grade organization he is now a part of.

It seems though that faults like this might be corrected through a profit sharing plan, which would instill a spirit of individual incentive into the men. In the first case described the trouble can be traced to the dealer's organization; first: for not taking advantage of the educational facilities offered through the traveling representatives of the factory; second: for not exercising a personal supervision of the men, supplemented by periodic conferences for discussion of the methods of repair.

Generally each organization has its "crack mechanic." The repair department would be vastly benefited, if the new members of the service force were placed under the tutelage of this man, for a short while. This plan would of course reduce the output of this valuable member but the other mem-

bers would be made so much more valuable that the expense would not be noticed.

The subject of organization conferences is one that is gaining more and more favor. It has proven of inestimable value to large institutions. To small concerns it will prove itself just as valuable. The educational value gained through a conference of this kind gives the wide-awake man the benefit of the combined knowledge gained during the month, say, by the whole force. In this way the interchange of ideas will allow one man to assimilate the knowledge gleaned by the entire force during a given time.



THE PIKES PEAK HILL CLIMB

IF you remove competition from a sporting event, whether it be a football game or automobile race, that event ceases to be a contest and the results mean practically nothing. With all due credit to the cars which won the Pikes Peak

Hill Climb recently, the fact remains that the event could have been held under conditions which would have been more favorable to all the entrants.

We are of the opinion that the Pikes Peak event could be made a real contest along with events such as the Indianapolis Five-Hundred Mile race and the Elgin Road Race, wherein all contestants run under identical conditions. If it rains during the Indianapolis race, all cars will be affected in the same way, or if the sun happens to shine, all will be equally affected.

With the Pikes Peak climb this year, several things might have been different. In the first place we believe this event should be held earlier in the year, to avoid the possibilities of inclement weather which played quite a part in this year's event. Secondly, the cars might be started at intervals of two or three minutes instead of 10 or 12 minutes. This would be far more interesting from a spectator's point of view and the cars would be closer together and thus be more apt to encounter the same weather conditions.

It also would seem desirable to hold elimination trials similar to those of speedway races, wherein the fastest car would start first and the others in the order of qualification. This would, in the case of Pikes Peak, make it possible to run the event with the likelihood that the cars would not have to pass at any point on the climb.

Finally the event should be handled by the officials of the A. A. A., so that there is every assurance that no discrepancies might exist in the timing, etc. The climb up Pikes Peak this year was largely a matter of weather conditions. While the footing was good, even with snow on the ground, some of the drivers were obliged to drive their cars with greater caution and resultant slower time, because of the fact that they were blinded by the snowstorm.

It is to be hoped that next year's event, if it be staged, will be run on the same businesslike basis as Indianapolis and Elgin events. Only when cars perform under the same conditions can we expect to draw from contests lessons which will give the industry something tangible.

Alteration of Policy in New Price Lists of Jumbo Trucks

No Reduction Is Represented and No Likelihood of One Within Next Six Months

SAGINAW, Mich., Oct. 15—The Nelson Motor Truck Co., makers of Jumbo trucks, in announcing a new price schedule state that these prices do not represent a reduction but merely an alteration of policy by which the trucks are now priced on the same basis as is customary in the industry.

The new prices as quoted by the factory are as follows: Model 15, chassis, \$2,425; with extras, \$2,850; Model 20, chassis, \$2,675; with extras, \$3,100; Model 25 S, chassis, \$3,090; with extras, \$3,450; Model 25 L, chassis, \$3,165; with extras, \$3,525; Model 30 S, chassis, \$3,590; with extras, \$3,950; Model 30 L, chassis, \$3,665; with extras, \$4,025; Model 35 S, chassis, \$4,080; with extras, \$4,550; Model 35 L, chassis, \$4,180; with extras, \$4,650; Model 40 S, chassis, \$4,730; with extras, \$5,200; Model 40 L, chassis, \$4,830; with extras, \$5,300.

WINTER PRICES GUARANTEED

Kenosha, Wis., Oct. 16—The Winther Motor Truck Co. has announced that list prices on all of its truck models will be guaranteed against any decline up to April 1st, 1921. Winter prices now range as follows: Model 751, $\frac{3}{4}$ -1 ton, \$1795; 39, $1\frac{1}{2}$ ton, \$2450; 430, $1\frac{1}{2}$ ton F. W. D., \$2850; 49, 2 ton, \$3250; 450, $2\frac{1}{2}$ ton F. W. D., \$3690; 70, $3\frac{1}{2}$ ton, \$4200; 109, 5 ton, \$5250; 140, 7 ton, \$5900.

CLYDESDALE GUARANTEES PRICE

Clyde, O., Oct. 16—The Clydesdale Motor Truck Co. has guaranteed present prices until April 1, 1921. Should there be a cut in price purchasers will be refunded the amount of such reduction.

MULLIN PLANS NO REDUCTION

Youngstown, Ohio, Oct. 18—The Mullin Body Corp. of Salem, Ohio, are continuing operations on a heavily reduced schedule and are working only 50 per cent of the production and capacity that was established in the last two years. Production of bodies for Lincoln, LaFayette and Cadillac cars is going forward on schedule and up to the original

specifications. Reduction in the output has been placed against body orders for other cars. H. C. Nelson, general superintendent, states that at this time there is not the slightest indication that the company will reduce its prices, in the face of steadily stiffening steel prices. Sheets for the Mullin company are not expected to be obtainable at lower prices for many months.

GRAMM-BERNSTEIN REDUCES

Lima, Ohio, Oct. 14—The Gramm-Bernstein Motor Truck Co. has announced the following reductions on its trucks: Model 15, $1\frac{1}{2}$ ton, internal gear, unequipped, from \$2,250 to \$2,050; Model 65, $1\frac{1}{2}$ ton, worm drive, \$2,775 to \$2,725; Model 20, 2 ton, \$3,275 to \$3,175; Model 25, $2\frac{1}{2}$ ton, \$3,875 to \$3,575; Model 30, interurban and oil field special, $2\frac{1}{2}$ ton chassis with $3\frac{1}{2}$ ton engine fully equipped with pneumatic tires, from \$4,975 to \$4,575; Model 35, $3\frac{1}{2}$ ton, \$4,775 to \$4,375; Model 50, 5 ton, \$5,875 to \$5,275.

TIRE BUILDERS ON PART TIME

Akron, Ohio, Oct. 16—Goodyear tire builders have been placed on a four-day a week schedule until after inventory taking. The production will thus be cut from 16,000 to 12,000 tires daily. The company expects to resume a five day a week program in two or three weeks. The announcement says that other departments are not affected by the short week order. According to employees another lay-off occurred in connection with the short week order the hands voting on the proposition to lay off 5000 and continue the five day a week schedule or lay off 3000 and work four days.

Boston, Oct. 16—The Hood Rubber Co. has laid off 900 of the men in its tire department. Only 100 men remain. It is the only department where the 10,000 working force has been lowered, the rest of the plant working full time. Reason for the lay-off was given as lack of buyers for the tires.

ROLLS-ROYCE INCREASES FORCE

Springfield, Mass., Oct. 15—One hundred and fifty men have been added to the Rolls-Royce force in this city, making 650 all told. Unit assembly is about to begin. Claude Goodman Johnson, head of the Rolls-Royce company, has arrived in America for another visit to the American plant.

September Shipments Greater Than Showing Made Last Year

Reports to N. A. C. C. Also Show Fuel Situation to Be More Satisfactory

NEW YORK, Oct. 15—Reports to the traffic department of the National Automobile Chamber of Commerce, disclose that in spite of the depression which has caused heavy curtailment of production, shipments for September were larger than for the same month last year. Under the circumstances this was considered a remarkable showing and was taken as evidence that when profits are added up to the year they will reach very respectable proportions.

Reports covering most of the shipments for September showed that they totalled 87 per cent of the carloads shipped in August. Driveaways were 74 per cent and boat shipments 75 per cent of the August record. This indicates that complete reports from all factories should show shipments of 20,000 car loads, 25,500 driveaways and 5,340 cars shipped by boat. The total of shipments is larger than in September of last year. There were fewer carloads but the driveaways and boat shipments more than made up the difference.

Discuss Fuel Situation

Gasoline was discussed at length and reports showed that the situation is satisfactory, although on July 31 the reserves were down to 25 days supply compared with 27 days supply when the gasless Sundays were put into effect during the war. Oil from Mexico is coming in at the annual rate of 100,000,000 barrels, or twice as much as last year. Crude production is now breaking all records, running at the rate of 575,000,000 barrels a year as compared with 377,000,000 barrels last year.

Oil men insist exports are having effect because more gasoline is being brought in in crude oil than is being sent out of the country. The mid-summer survey of 80 samples showed the quality poorer than usual and the N. A. C. C. will insist on a better quality for winter. A number of oil companies have expressed disappointment over the comparative falling off in the use of gasoline during July and August.

Mr. Dealer! How You Can Do Your Industry a Service

WOULD you like to know how your fellow dealer keeps busy in winter? If so, won't you please drop us a line telling us about the most important thing you do to insure your shop keeping busy? In some localities the deep snows make the roads almost impassable,

and dealers are forced to turn their efforts to some other phase of their business to keep things going.

What did you do last winter that netted you profits? Your ideas may suggest some new things to the other dealers, and their ideas may be new to you.

An interchange of ideas is bound to benefit all.

When you have finished reading this won't you take a pencil and jot down on a sheet of paper the thing that keeps your business going and mail it to us?

Indianapolis Conditions Adopted for French Race

**So Much Opposition Developed to
Original Rules That Change
Was Necessary**

BY W. F. BRADLEY

European Correspondent of Motor Age

PARIS, Oct. 1—Indianapolis conditions have been adopted for the 1921 French Grand Prix race, the first big post-war speed contest to be held in Europe. In adopting a maximum piston displacement of 3-litres and a minimum weight of 800 kilos (1763 lbs.) without any preliminary engine test, the Racing Board of the Automobile Club of France has given way to the desires of the manufacturers. The original rules, under which no car could start in the race unless its engine had developed 30 hp. at 1000 revolutions and 90 hp. at 3000 revolutions for a full period of one hour, aroused so much opposition in racing circles that if they had been maintained no race could have been held.

To mark his approval of the change, Ernest Ballot filed four entries within an hour of the new rules being announced. These are eight cylinder cars similar to those which competed at Indianapolis this year. Other European firms looked upon as very probable contenders in the big French race are Peugeot, Delage, Bignan, Fiat, Gregoire, Sunbeam, Darracq, Talbot, Voisin, Rolland-Pilain and Minerva.

Tail Length Limited

Under the new French rules the minimum weight must be obtained with body, four wheels and tires, with oil in base chamber, but without water, gasoline, tools, spares, or spare wheels. The driver and mechanic must together weigh 264 lbs. The only body restriction is that the tail shall not extend further than 20 in. beyond the rear axles. Entry fees have been fixed at 15,000, 26,000, 35,000, 43,000 and 48,500 francs for respectively one, two, three, four and five cars from the same firm. Entries are received until December 31st, and on payment of double fees until February 28, 1921.

The French Grand Prix is a road race over a distance of approximately 500 miles, and probably will be held in Alsace, near Strasbourg. There are half a dozen towns on the waiting list, and a choice will be made after a consideration of the advantages offered by each, both as regards roads and organizing facilities. The date has not been decided on, but probably will be during the middle of the summer and sufficiently late to allow American cars to appear and to permit French drivers to return from Indianapolis.

The 3-litre rule will be the only one employed in Europe next year. There will be six really big races for cars of this size. The first speed contest will be on the Island of Corsica in the early spring. The French Grand Prix, which is the most important speed contest in Europe, may be expected to be held be-

tween the middle and the end of July. Belgium will follow with its Grand Prix road race probably in August. There will be a big 500-mi. race, modelled on Indianapolis, held on Brooklands track, England, during the month of September, and during the same month the final 3-litre race will be held on a course near Le Mans, France. American cars are counted on to start in some of these races.



FRANCE WINS BENNETT TROPHY

BY W. F. BRADLEY

European Correspondent of Motor Age

Paris, Oct. 1—By the victory of Sadi-Lecointe, piloting a Nieuport biplane with 300 hp. Hispano-Suiza engine, the James Gordon Bennett trophy has been won for the third time by France and will remain permanently in that country. Sadi-Lecointe's time for the 186.4 mi. was 1 hour 6 min. 17 1/5 sec., giving an average speed of 168.7 mi. an hour over the 31 mi. course. This was less than the speed predicted, an average of not less than 186 having been expected, and claims of 200 mi. an hour having been made for practice work. Bernard De Romanet, on a Spad-Herbemont, finished second in 1 hour 39 min. 50 3/5 sec. No other flyer covered the full distance.

COOPER, RACER, DIES

Danbury, Conn., Oct. 15—Harry Cooper, 35, of New York, who has participated in automobile races for a number of years, died in the Danbury hospital following injuries received in a race at the Danbury fair. His car skidded on a turn during a ten-mile race on a half-mile track.

New Hill Climb Record Made by Rene Thomas in Sunbeam

Paris, Oct. 12—(By Cable)—Rene Thomas, the famous race pilot, driving a 450 hp. Sunbeam car, established a new record today in the Gaillon kilometre hill climbing record. His speed was at the rate of 108 m. p. h.

SELL TRACTORS IN TIMBER BELT

Antigo, Wis., Oct. 15—The Murray-Mylrea Machine Co., distributor of the Holt tractor in northern Wisconsin, is making an excellent record of sales to logging and lumber manufacturing concerns in the hardwood and hemlock timber belt in that section. The Langdale Lumber Co. has purchased one 5 and one 10-ton Holt; the Brooks & Ross Lumber Co., Schofield, Wis., two 5-ton and one 10-ton Holt; the Hatten Lumber Co., New London, Wis., one 10-ton Holt and R. C. Theilman Co., Tomahawk, Wis., one 5-ton Holt.

France Holds Tractor Trials With Fordson in Competition

**One Hundred Makes Representing
All Nations Entered—40-hour
Non-stop Test a Feature**

BY W. F. BRADLEY

European Correspondent of Motor Age

PARIS, Oct. 4—(Cable)—The French agricultural tractor trials, in which 100 machines from all the nations engaged in the industry are competing, commenced this week at Chartres. Approximately 3,000 acres will be plowed. Features of the competition are a 48-hour non-stop test and a drawbar test. It is the announced intention of the Ford company to run a Fordson six days and nights without a stop. Citroen, Sizaire & Naudin and Dorio-Flandrin are automobile firms which have entered the tractor field.

LAST RACE IN PREPARATION

Los Angeles, Oct. 11—The automobile racing season will come to an end this year on the speedway at Beverly Hills. The first race of the season was run on the same course. Already preparations are being made for the event. Inasmuch as it will determine the winner of the national championship for 1920 all drivers will be anxious to compete. Several of the leading drivers and their cars are now barnstorming in this part of the country. In connection with the automobile race a great aerial carnival is to be staged. There will be an exhibit of aircraft that is likely to prove the largest thing of the kind ever held on the Pacific coast.

TAMPICO BUYING TRUCKS

Tampico, Mexico, Oct. 15—Joe W. Nibel of Tampico is now in the United States for the purpose of purchasing a fleet of motor trucks for use in transporting materials and supplies in the oil fields of this region. The first shipment will consist of two 5-ton and one 3 1/2-ton trucks and this will be followed by other consignments. Regular truck lines will be established between Tampico and the different oil camps. Most of the fields are connected by means of good highways which were constructed by the oil companies. There are already many motor trucks in use in the oil producing region and the handling of the many things that are needed in connection with the industry has been greatly expedited over what it was in the early period of development work.

GREATER GILL PRODUCTION

Chicago, Oct. 14—At the sales convention of the Gill Mfg. Co. held in this city the report of the sales department showed that the sale of Gill one-piece piston rings had increased more than 79 per cent over the gross business of its first year, 1916.

Electric Railway Men Hear Discussion of Motor Buses

Pierce-Arrow Executive Tells Them What He Would Do to Help Situation

ATLANTIC CITY, October 15—That motor buses are one of the most effective means for rebuilding the vanished credit of the electric railways of the United States was one of the most important statements made by George M. Graham, Vice-President of the Pierce-Arrow Motor Co., Buffalo, N. Y., in his speech "The Motor Vehicle—Competitor or Ally" presented before the thirty-ninth annual convention of the American Electric Railway Association here.

Mr. Graham as a member of the automotive industry made two other recommendations to the electric railway interests. These were to leave the carrying of freight to the steam railway and the motor truck, and to eliminate unfair bus competition by installing buses themselves.

Comments heard among the 200 railway men present at the meeting after Mr. Graham had concluded his address showed that the consensus of opinion seemed to be that the electric railway industry was so close to its own problems that it needed vision from an outsider as to how the motor bus could be employed to the best advantage in connection with city passenger transportation. Mr. Graham's statement that "it makes no difference whether the power that mints the coin comes from the leap of the electric current or the explosion of the internal combustion engine" was well received and applauded.

ILLINOIS TRAINS MECHANICS

Bloomington, Ill., Oct. 15—With the endorsement of the Bloomington Automobile & Tractor Dealers' Association the board of education has introduced a course in motor vehicle mechanics in the local high school. The board has purchased two second hand cars and these will be dismantled and assembled by the pupils. Thirty pupils joined the class at the outset and the number will likely be increased as the winter season progresses.

GEORGIA CAMPS USE TRUCKS

Macon, Ga., Oct. 15—There is not a lumber camp in Georgia that does not have motor trucks with large pneumatic tires. The owners state that they can get through the swampy land and over the rough spots better and safer with this equipment than with any other.

USED CAR SALES INCREASE

New Orleans, Oct. 15—More men are buying used cars in New Orleans than ever before in the history of the automobile in the South, according to the Abbott Automobile Co. of this city, which maintains one of the largest used-car depart-

ments in town. This firm estimates the increase in used-car purchases over those of last year at about 30 per cent, and attributes most of the increase to the fact that sales of used cars are made on longer time and easier payments than new cars. Reductions in the prices of the cheaper cars seems to have made little or no change in the demand for used cars, since the man who wants a certain make of car usually prefers to take a used car of that make to buying a new one of another and cheaper grade.

RECEIVER IN SINCLAIR MOTORS

New Orleans, La., Oct. 15—Receivers have been appointed to take charge of the business and plant of the Sinclair Motors Co. George M. and Charles L. Long, stockholders residing in Mississippi, applied for the receivership. The company manufactures an engine invented by Alfred C. Sinclair, president of the organization. In the petition for receivership mismanagement is charged.

TIRE DEALERS CUT PRICES

Hartford, Conn., Oct. 15—Tire dealers in this vicinity in an endeavor to move stock are advertising broadcast reductions of 20 per cent or more on standard brands of first quality tires. This action is being followed by the old line houses that seldom resort to a cut in price. Practically all dealers are well stocked up at this time. Expenses are being cut down in every possible way.

CHICAGO TO HAVE FALL DISPLAY

Chicago, Oct. 15—The autumn automobile exhibit will be held by Chicago dealers from Nov. 6 to 13 inclusive. This will be an exhibit of fall and winter cars, accessories and seasonable appurtenances the aim being to focus public attention on the industry and stimulate special interest. The dealers will decorate their show rooms in keeping with the autumnal season, and will probably keep open evenings during the week.

PENNSYLVANIA DEALERS ELECT

Allentown, Pa., Oct. 15—The second annual convention of the Intra-State Motor Dealers' Association, held here on Oct. 11, elected the following officers: George G. McFarland, Harrisburg, president; E. T. Satchell, Allentown, first vice-president; J. B. Arbuckle, Eris, second vice-president; D. W. Ranck, Lancaster, third vice-president; H. C. Kohler, Reading, fourth vice-president; Roy W. Shriner, Lancaster, secretary, and Harry Schrock, York, treasurer. The attendance made a record for an automobile men's gathering in this city. The Lehigh Automobile Trade Association entertained the dealers at dinner. Directly following the dinner, the business meeting was held. Addresses were made by B. F. Drury, assistant manager of the National Dealers' Association; E. T. Satchell, of Allentown, and George G. MacFarland, of Harrisburg, who discussed important phases of the automobile situation.

Focus Centered on Used Cars in Preparation for Winter Season

Dealers in Indianapolis Put New Automobiles in Background This Week

INDIANAPOLIS, October 16—Remarkable prices have been set by local dealers on used and rebuilt automobiles this week in order to get these cars off their hands before the winter season sets in. The better to accomplish this a sort of informal used car week has been evolved and special attempts have been made by local dealers to attract the public attention to these special bargains. Many dealers have concentrated all their attention upon getting rid of these used and rebuilt cars. They have moved temporarily their news cars to the background and have given the most prominent positions in their display rooms to the used cars.

To get the public attention the R. V. Law Motor Co., distributor for the Hudson and Essex cars, has carried large display advertisements in the daily papers and notices in the classified advertising columns of the sale. A large sign fully seventy-five feet long covers the front of their building announcing the "First annual sale of used and rebuilt automobiles." The R. V. Law Motor Co. rebuilds all its own second-hand Hudson and Essex cars and overhauls cars of other makes taken in trade.

The Dickey Motor Sales Co. is making its appeal to rural customers in its sale of used cars. They have advertised extensively in the small town and county newspapers and are getting cars off the floor at the best price possible—but they are getting them off at any cost before the bad weather comes. For weeks after the Ford price cuts, the used car business was demoralized and most dealers are making their final attempt now to move their second-hand cars. Salesrooms are kept open until 10 o'clock at night.

The E. W. Steinhart Co., which deals extensively in second-hand cars, has followed its old custom and will have its annual used car sale in January or February as in former years.

PREPARING TO MAKE CARTER CAR

Gulfport, Miss., Oct. 15—The Carter Automobile Co., which holds patents on a steam-driven passenger car, has nearly completed its plant here for the manufacture of the new automobile, and announces that work will be started by Dec. 1.

BUDA MAKES REDUCTION

Chicago, Oct. 15—Under date of Sept. 29 the Buda Co., Harvey, Ill., reduced the prices on its engines \$10 to \$15 per unit. This reduction, it is explained in the announcement, was voluntary on the company's part and was done with the idea to endeavor to assist in stabilizing and bringing back the business to normal in the automotive industry.

Dealers' Association of Oregon Reorganizes and Changes Name

M. O. Wilkins Retires as President and Becomes Secretary and Manager

PORTLAND, Ore., Oct. 15—A general reorganization of the Dealers' Motor Car Association of Oregon, including a change of name to the Automobile Dealers' Association of Portland, was effected this week at a meeting of Portland motor car and truck dealers. The new name is considered more descriptive of the general purpose and function of the organization, which is not a state-wide body.

Prior to the recent formation of the Oregon Automotive Dealers' Association, an affiliate of the National Automobile Dealers' Association, the Portland body really exercised state-wide influence, although its membership was confined to Portland distributors and dealers. However, the formation of the new state-wide body was undertaken with its full consent and co-operation, and most of the Portland dealers are members of it. With the reorganization of the Dealers' Motor Car Association of Oregon, M. O. Wilkins, president since its formation in 1916, retires from that office and takes the new position of secretary and manager. Mr. Wilkins is not a dealer and the by-laws of the new body require that the president shall be a dealer member.

The association is empowered by its by-laws to hold automobile shows, which does away with the necessity heretofore of having shows conducted by a subsidiary body, the Portland Automobile Trades Association.

COMPLAIN OF QUALITY OF GAS

Hartford, Conn., Oct. 16—Numerous complaints are being received by service and gasoline stations on the quality of gasoline now being sold. Engine trouble appears to have developed to an unusual degree. Gravity of present day gasoline is said to be around fifty-two which is quite a drop as compared with what was offered a year ago. The situation has, however, worked to the advantage of those who sell improved carbureters and these dealers are making the most of the situation to further the sales of their product.

BATTERY PLANT DAMAGED

Gary, Ind., Oct. 15—Fire which damaged the plant of the O. K. Giant Battery Corp. of this city destroyed all records of orders, sales agency inquiries, contracts, etc. The fire was confined to the building containing the offices of the corporation.

DEALERS SEND OUT PATHFINDER

Kansas City, Mo., Oct. 18—The Kansas City Motor Car Dealers' Association is sending a pathfinder car over the Kansas City automobile sales territory. The motor car jobbers and dealers in this territory find it pays to cultivate the

good will of the sub-dealers and that there is nothing that helps business out here more than a personal touch with the trade. This is the object of the tour. During the first four days the car covered 632 miles and made stops at thirty-one towns. L. T. Hill of the Hogan Sullivan Car Co. is driving the car and E. H. Coleman of the association is making arrangements for the reception of the good roads boosters at each town. One hundred and twenty-five dealers in thirty-five cars are making the trip. There are also several trucks on the tour.

Twelfth Service Association of Record Now in Baltimore

Baltimore, Oct. 15—Every service manager in Baltimore has been invited to a meeting to be held Oct. 18 for the purpose of completing a service organization. A temporary association was formed last week when managers of eighteen repair and service stations were entertained by the Baltimore Automobile Dealers' Association. E. L. Baker was named temporary chairman and John C. O'Brien, temporary secretary. At that time a committee was appointed to draft a constitution and by-laws. This will be the twelfth service association of record in the United States.

AIR SERVICES MERGE

New York City, Oct. 15—A consolidation of the Aeromarine Engineering & Sales Co. with the Florida West Indies Airways, Inc., has been effected. The new organization will be known as the Aeromarine-West Indies Airways, Inc. It will operate a fleet of six large Aeromarine navy cruisers in the Key West-Havana service, carrying passengers and mails. The contract with the Post Office Department which was signed recently entails a daily service each way. It is estimated that mail deliveries will be advanced 24 hours with the flying boats.

State Capitol Again Selected as Meeting Place for Dealers

Indiana Automotive Association Will Hold First Convention at Indianapolis Nov. 4-5

INDIANAPOLIS, Oct. 15—The convention and organization meeting of the Indiana Automotive Dealers' Association will be held in the capitol here Nov. 4 and 5, according to an announcement of Harry G. Moock, general manager of the National Automobile Dealers' Association. This is the first time the Indiana state capitol has been used for a meeting of the automobile trade and the second time that a state capitol has been used for such a meeting in the United States. In advocating its use, Mr. Moock believes that the state capitol should be the center of work looking to the civic growth and upbuilding of industry.

The call for the convention has been sent out by the national association and already responses have been received indicating that the entire state will be represented. Especial commendation has been received from the Indianapolis Automotive Trade Association, which in the past has carried practically the entire brunt of the state work.

Mr. Moock believes on account of the present critical conditions in the industry and the fact that this state meeting will give all the dealers of the state an opportunity to hear the leading national speakers regarding the future of their business, that there will be over 1,000 men present at the convention.

MYERS SECURES FOREIGN PATENTS

New York, Oct. 15—Patents have been issued by France, Belgium and Italy covering the Myers magazine oiling system of chassis lubrication which is used on the Liberty Class "B", Fageol, Diamond T. Ward, La France, Service, Bethlehem and several other trucks in the United States.

North Carolina and South Carolina Dealers Hold First Meet



North and South Carolina dealers and distributors photographed between sessions of the first annual convention of the Carolinas' Automotive Trade Association, held in Greensboro, N. C., at the O. Henry Hotel. Lee A. Folger, re-elected president of the organization, is shown sixth from the right on front row. Several hundred delegates were in attendance at the meeting which, as decided at the convention, would be a semi-annual event

General Financial Situation In Industry Is Encouraging

Few Automotive Corporations Are In Difficulties at This Time— False Reports Continue

NEW YORK, Oct. 15—Attention of the automotive industry has been focussed on price cuts for the past fortnight almost to the exclusion of the general financial situation. The industry has not suffered because of this fact, however, for conditions are distinctly encouraging.

The federal court has refused to find the William Small Co. insolvent and the federal receiver has been supplanted by one appointed in an Indiana state court. It is intimated that a widely known American manufacturer will invest a large sum in the company and even if this is not done there is reason to believe efficient management will put the Monroe makers back on their feet.

Negotiations now pending are expected to pull the Spacke Tool & Machine Co. out of its present difficulties. The assets greatly exceed the liabilities.

A new plan for re-financing the Standard Parts Co. has been adopted by the various committees appointed by Federal Judge Westenhaver and the lifting of the receivership is expected in a short time.

The position of the Bethlehem Motors Corp. is not as satisfactory as might be wished but its affairs are not by any means in a hopeless muddle.

Reorganization of the Allen Motor Co. is progressing rapidly and its future is brighter than even its staunchest supporters might have hoped.

Except for one comparatively small passenger car company these are the most important automotive corporations in financial difficulties at this time. There has been no cessation, however, of the false, misleading and even libelous reports circulated in the financial quarters of this and other cities about receiverships, actual and pending, for passenger car and truck companies. There is little doubt these rumors are started deliberately by professional stock market traders in the hope of causing depression so they can make profitable short sales. The National Automobile Chamber of Commerce and the Motor & Accessory Manufacturers' Association, the two strongest organizations in the industry, have warned their members against scandal mongers and the serious mischief caused by the repetition of slanders.

Distributors Staff of Hare's Motors Undergoes Changes

New York, Oct. 14—Fred H. Miller, former southern representative, has been appointed general sales manager for Hare's Motors of New England and is succeeded by T. S. Coleman, formerly general sales manager of the Packard Motor Car Co. of Pittsburgh. John J. Bergen, formerly general sales manager of the Packard-Nashville company has been named special representative for

Texas, Oklahoma, and a part of Louisiana, while the Central West will be handled by R. F. Riffie who resigned as general sales manager of the Marmon-New England organization to accept his present position.

Fred Klauer has been placed in charge of the New England branch at Worcester, Mass., succeeding F. D. Trapp who is assuming the management of the Bridgeport branch for Hare's Motors of Connecticut. A. T. Schmidt has been made service manager of the Worcester branch.

BATTERY FIRM FOR TORONTO

Toronto, Ont., Oct. 16—A half million dollar plant is to be erected by the Willard Automobile Storage Battery Co., of Cleveland, on three acres of land bought for \$70,000 from the Wilkinson Plow Co. The Willard is the fourth storage battery company to locate in Toronto.

Educational Program to Be Important at Tractor Show

Columbus, Ohio, Oct. 15—In connection with the educational lectures and the mass meetings which will be features of the sixth national tractor show to be held at Columbus Feb. 6 to 12, an effort is being made to interest every exhibitor in the educational program to the extent that he will not only install a service booth, where this is practical, putting competent service men in charge who will be able to answer all questions regarding repair, operation, etc., but also will build into his exhibit some educational idea.

Where this matter has been taken up with exhibitors there has been a wholehearted response, and it is believed that the 1921 show will have a greater educational value to the dealer and farmer than any exhibit of farm equipment which has been made in this country.

MORE DENMAN CORD TIRES

Warren, Ohio, Oct. 15—Increased production of Denman cord tires, manufactured by the Denman-Myers Cord Tire Co. here, has started with the completion of the company's new plant and the installation of all the machinery. Walter E. Myers, president, states that sales connections are being established throughout the country and that indications point to a rapid development in the distribution of the product.

PRICES OF SPRINGS REDUCED

Detroit, Oct. 12—L. A. Young, president of the L. A. Young Industries, formerly the Detroit Wire Spring Works, in telegrams to their customers announce radical reductions in the prices of cushion springs. Mr. Young announced that the prices would become effective at once, despite the fact that a great majority of the firm's contracts, amounting to many millions, had some months to run. He declared the company was prompted by a feeling that the patriotic duty of the manufacturers of this country was to aid in a return to normal prices.

Talks on Service and Selling Part of Private Truck Exhibit

Show Advertised to Prospective Buyers and Develops Keen Interest

PHILADELPHIA, Oct. 14—To familiarize truck owners and prospects in this city and vicinity with the new models of Pierce-Arrow trucks, the Foss-Hughes Co. has been staging a truck show in the company's truck salesrooms under the supervision of the manager of the truck sales department, William P. Craig.

The new models, representing the recent expansion of the Pierce-Arrow line, were driven under their own power from the factory in Buffalo to this city. The show was advertised through personal invitations sent out chiefly to customer prospects. It remained open until 10 o'clock at night and at 5 o'clock in the afternoon Edmund B. Neil, mechanical engineer at the factory, gave a short talk to the service and sales force on the points in the new models, explaining and answering questions.

Mr. Craig expresses himself as highly pleased with the show both from the viewpoint of publicity and because the prospect list has been materially increased. Small truck shows of this kind, he believes, are of great benefit to the dealer as well as to the factory, the prospects giving closer attention to fine points than at a large show where there is much to divert the attention.

Pointers which could be used to advantage by other truck dealers contemplating private shows include the placing on one of the walls in a commanding position a scene in colors showing what the various trucks can do on the road.

To Draft Uniform Traffic Law At Cleveland Meeting Nov. 10

Cleveland, Oct. 14—Executives of the automobile industry, representatives of motor clubs, police chiefs and traffic experts will gather here on Nov. 10 to draft a model traffic law for all states in the United States and Canada, a matter that was taken up at the annual convention of the National Traffic Men's Association in San Francisco in August.

A sub-committee of the traffic association's executive committee was given the responsibility of drafting the measure but men interested in the subject in the two countries will be given an opportunity to present their views.

The gathering in this city was scheduled originally for Dec. 2 but the date has been set forward so that the measure adopted may be submitted to the proper authorities long enough in advance of the convening of the state legislatures to enable them to organize for the task of furthering the enactment of the bill.

Texas Dealers Will Offer Plan to Legislature to Stop Thefts

System of Car Stealing Can Be Broken If Law Makers Realize It Exists, They Say

ALLAS, Texas, Oct. 15—Automobile dealers and insurance writers will combine their efforts with a view to having the regular session of the State Legislature which meets in January pass a law which they believe will practically eliminate the thefts of automobiles in this state. The legitimate dealers declare, and the automobile insurance men confirm their statements, that the business of stealing motor cars in Texas has grown to such an extent and is so well organized that something must be done to break up the practice.

The dealers say the breaking up of the organized system of stealing cars appears simple enough if the law makers can be made to realize the fact that there is such an organization of thieves. They declare that a complete bill of sale with every car and a penitentiary sentence without the benefit of a suspended sentence would drive automobile thieves out of Texas in ninety days. Hence they will offer the following suggestions to be embodied in a bill at the next session of the legislature:

That every car bought by a dealer in Texas have a complete bill of sale from the manufacturer; that when this car is sold a customer the dealer give him a copy of the manufacturer's bill of sale and also his own bill of sale to the car; that if the customer sells this car he must give copies of bills of sale with his own and that each and every sale must carry with it a complete bill of sale from the factory to the last man making the sale.

The dealers would further make it a penal offense for a sale to be made without the proper bills of sale. They declare this would make second hand dealers more careful about buying cars and customers who buy second hand cars more careful about accepting them. The Texas dealers would make it unlawful for any county or state, municipal or other officials to license an automobile, or register the same without first being presented with bills of sale for every transaction through which the car passed. They would send automobile thieves to the penitentiary for not less than ten years nor more than fifty.

MERCER AND LOCOMOBILE JOIN

New York, Oct. 15—The board of directors of the Locomobile Co. and the Mercer Motors Co. have unanimously approved of the consolidation of the two companies under the title of Hare Motors, the action now being left to the stockholders of both companies for ratification. As the Mercer Motors Co. has already absorbed the Simplex Automobile Co., the latter automatically becomes a part of the new

manufacturing combination at the same time as does Mercer.

This combination is of the manufacturing companies and will not affect the distribution and selling plans, as Hare's Motors, the operating and distributing company, will operate along the lines originally planned. The only change will be instead of separate factories, operating under different names, they will now all be part of one single manufacturing company with the subsequent simplification of management.

TO COMPLETE WORK ON OWEN CAR

Wilmington, Del., Oct. 14—Upon petition of the receivers recently appointed for the Owen Magnetic Motor Car Corp., Wilkes-Barre, Pa., the United States District Court here has entered an order authorizing the receivers to borrow

There Are Prospects For Dealers in Georgia

MACON, Ga., October 15—Watermelon men throughout this state, famous for its melons, are figuring how they are going to market their crop next year at a profit. That the higher freight rate will hit these farmers more than any other class, is admitted here, for melons are shipped on a close margin of profit.

Georgia shipped approximately 10,000 carloads of watermelons to eastern and northern markets the past season. Many of the farmers hauled these to railroad shipping points by mule-drawn wagons, but to shave down the cost of handling and make up for the increased freight rate it is understood that many of them will use motor trucks for this purpose in the future.

\$100,000, at a rate of interest not over 6 per cent, to be used in completing a block of twenty-five automobiles which were under construction and nearly finished at the time the receivers were appointed.

ARMY TRACTORS FOR PLOWING

Harrisburg, Pa., Oct. 16—Big tractors built to haul heavy artillery for the United States army during the war, will be employed to draw plows in the fields and to cultivate the lands in the orchards of 1,200 acres of farm land attached to the army quartermaster reserve depot near Marsh Run, this fall and next spring. Big plows and machinery devised to dig trenches and prepare terrain for military tactics will be used with the tractors. All the work will be directed by state experts.

Service Prime Requisite For Overcoming Sales Resistance

Dealers Discuss Subject of Maintaining Efficiency of Tractors Following National Show

LOS ANGELES, Oct. 14—The perfection of service to the farmer so that ranch efficiency can be speeded up and, when motorized equipment is used, not ruined entirely through a break in the equipment, developed at the recent national tractor show here to be the biggest need of the tractor business today. Tractor users have raised the cry that when their machines fail to function and they have to wait for hours, or in some instances days, before repairs can be made the loss is greater than can be compensated for by using motor equipment.

This subject received a thorough discussion at a conference in which the dealers in Oliver implements and Fordson tractors participated. Representatives of the Oliver Chilled Plow Co. were present at the conference and all the dealers representing the W. L. Hughson Co. state distributors for the Fordson heard these men say they advocate a mutual benefit policy. That some system must be arrived at to keep tractor and power implement users satisfied was conceded. Both organizations agreed to furnish parts promptly and at all times to maintain liberal stocks of parts.

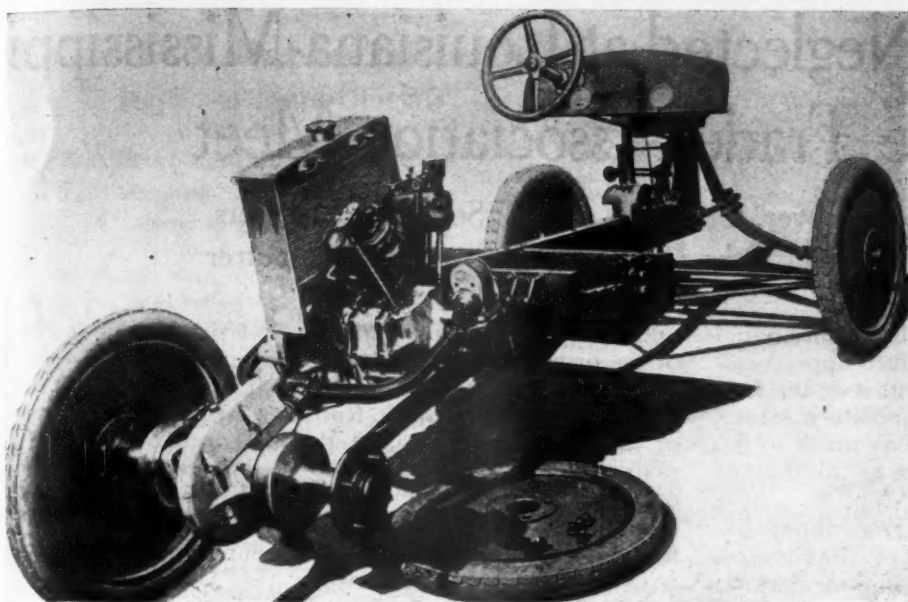
The Oliver representatives said they would send their service men throughout the state, have them visit every Fordson dealer and learn who was having trouble and make the repairs or adjustments. These men are to be skilled enough to repair the tractors if the fault is with them and not the implements. The representatives of the Ford Motor Co. took a similar attitude and declared that hereafter Fordson service men will make it their business to keep both tractors and implements in operating condition. It was agreed that as a means for overcoming sales resistance service is the prime requisite.

OIL STATIONS LOSE SUPPLY

Hartford, Conn., Oct. 14—Several local oil stations were under suspicion of offering one brand of oil when another was called for and in order to decide the matter definitely samples of oil in quart lots were purchased from several stations, tested out and found to be other than claimed. The result is that the offending stations have been cut off from their supply of the oil they alleged to sell and for which a substitute was actually given.

ISSUES SALESMAN'S MANUAL

Racine, Wis., Oct. 15—The J. I. Case Plow Works Co. has issued the "Salesman's Handy Manual" compiled by its educational department. It contains over seven hundred questions with answers on the Case line of tractor drawn tillage implements, Wallis tractor and Wallis thresher. It also has other interesting features.



Something New in Motor Car Design

THE latest French effort to produce a cheap automobile is a highly original design replete with features of unusual interest. It differs from the ordinary automobile in almost every particular. Radiator and engine are placed at the rear, the frame is of wood and its design is peculiar, while the mounting of the front springs is quite new.

The engine is a two-cylinder water-cooled motorcycle type with a honeycomb radiator mounted alongside the cylinders. Thermo-syphon cooling is used with separate connections to each cylinder. Engine, clutch and transmission are mounted on a yoked frame, the front of the yoke being swiveled on the wood frame.

The construction is such that the power plant and rear axle form a rigid unit, driving and torque strains being transmitted through this yoke frame member. Intake valves are operated by rocker arms. The rear springs are full cantilever type while the front springs are semi-elliptions, placed crosswise, their inner ends curving upward to form an inverted V.

This construction permits the use of long springs with great freedom of action. The front axle is secured fore and aft by the triangular wish-bone construction similar to that used on the Ford. Front wheel pivots are directly in line with the tire centers so that the wheels are inherently irreversible. The transmission is a three-speed type.

School to Devote More Time to Practical End of Instruction

Michigan Automobile College Cuts Time of Theoretical Class and Increases Shop Work

CLEVELAND, Oct. 15—Acting on information obtained by the Automotive Association of the Chamber of Commerce, the Michigan State Auto School of Detroit has announced that its previous course of six weeks theoretical instruction and six weeks practical instruction has been changed to three weeks theoretical instruction and nine weeks practical instruction.

Each day of the theoretical instruction period will be divided so that every alternate two hours will be in the shop. The practical instruction will cover the balance of the course of nine weeks and each day will be nine hours in length, so as to accustom students to shop hours.

Several months ago the association sent out questionnaires to one hundred service managers throughout the country, asking them the amount of time they

believed automobile schools should be required to place on various subjects. Their opinion also was sought concerning the value of the graduate of the school to the trade.

The service managers agreed that not enough time was given students on practical instruction, and that students left the schools as a result with the mistaken idea that they were full fledged mechanics.

DEALERS AGAINST SPEEDING

Cincinnati, O., Oct. 18—Automobile dealers here have joined with the Cincinnati Automobile Club and various welfare associations in a campaign to curb automobile accidents resulting from speeding and reckless driving. The Cincinnati Automotive Trades Association, through its Secretary, Ralph R. Curl, is directing the movement among the automobile dealers. Their first aim is to secure co-operation of all interests vitally concerned in the solution and to wage a vigorous campaign to educate both the motorists and the public to their responsibility and a code of strict personal safety.

Chain of Automotive Schools to Be Formed Through Country

Plan Calls for Establishment of Buildings and Equipment Costing Over \$250,000 Each

KANSAS CITY, Mo., Oct. 15—What promises to be one of the most extensive automobile school organizations in the country has been planned by Henry J. Rahe, president of the Rahe Automobile & Tractor School of Kansas City, and will be in operation within the next thirty days. The plan embraces the establishment of large automotive schools, building and equipment costing over \$250,000 each, located in the largest cities of five zones with Kansas City as the center.

The Kansas City territory will constitute the first zone. The second zone will include the territory within one thousand miles of Kansas City in all directions; the third, two thousand miles; the fourth, three thousand miles and the fifth, four thousand miles. A school, known as the Rahe Auto & Tractor School, will be established in a leading city of each of the five zones.

The school has made an extensive survey of past enrollment in the institution with the end of ascertaining the distance that students have been obliged to travel. The active head of the new organization will be Henry J. Rahe.

Victor Rubber Co. Denies Sale of Plant to Ford Contemplated

Springfield, Ohio, Oct. 15—Henry H. Durr, president of the Victor Rubber Co., declares that he knows absolutely nothing about reported negotiations with Henry Ford for the purchase of the plant.

"So far as I know," Durr said, "none of the stockholders have been approached by Mr. Ford or his representatives. Frank R. Tubott, our general manager, and myself are the principal ones involved and they surely would come to us if there was any movement on for the purchase of our plant. There is absolutely nothing to the story and the report may have been circulated for a purpose in the matter of prices."

FIRM TO MAKE STEAM TRUCKS

Garfield, Ohio, Oct. 15—Duncan Macdonald has resigned as president of the Gearless Motor Corp. of Pittsburgh, to produce in a large way steam driven trucks, tractors and omnibuses, the company being known as the Garfield Steam Truck Corp. A tract of land was secured here a number of months ago and the first unit of a series of modern factory buildings is now under roof and production machinery is being installed as rapidly as delivery can be made. Associated with Mr. Macdonald in the enterprise are men prominent in engineering and financial circles. Executive offices have been established in Pittsburgh.

Dealer Problems Neglected at Louisiana-Mississippi Automotive Trade Association Meet

P. E. Chamberlain, of Denver, Only One to Talk Service to Members and Makes Deep Impression. Other Speeches Deal with Manufacturer

GULFPORT, Miss., Oct. 11—The semi-annual convention of the Louisiana-Mississippi Automotive Trade Association developed at the first day of the two-day session into a composite meeting, the efforts of which were directed about as much to the benefit of motorists and manufacturers as to that of dealers and distributors.

This somewhat peculiar situation came about because of what appeared to be a sort of timidity on the part of the Louisiana and Mississippi dealers to discuss the situation in which the industry finds itself

and also partly because, for the first time in the history of the organization, the speeches were all made by men from outside these two states, such men as A. R. Kroh, of the Goodyear Tire & Rubber Co.; C. H. Brownell, of the Ford company, and P. E. Chamberlain, general manager of the Cadillac Motor Co. of Denver. The point of view of the former two, naturally, was that of the manufacturer. What they said concerning the dealer was mainly devoted to the improvement of his relations with the motorists of the two states. Discussion of real benefit to the dealer was negligible.

SMALL attendance marked the meeting, barely 150 of the dealers of both states, including tire and equipment men being present.

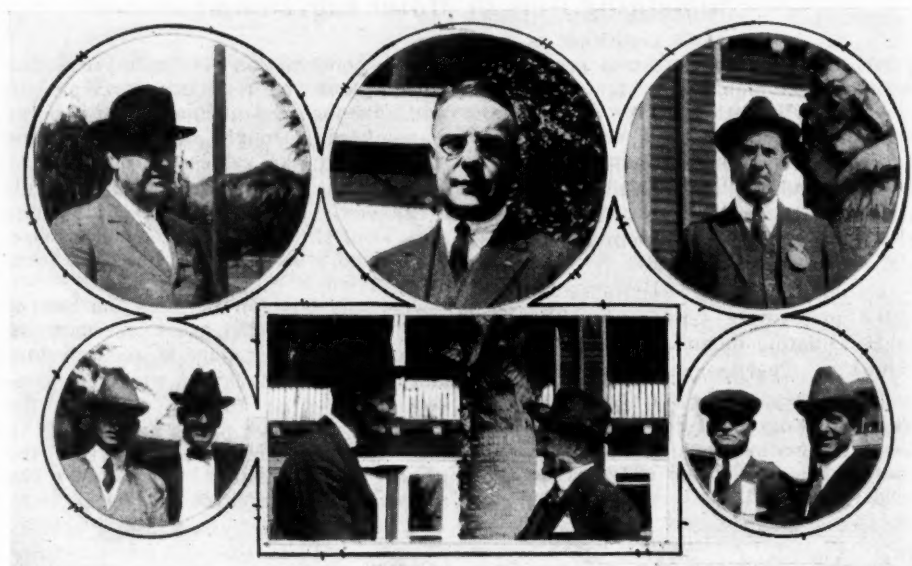
Mr. Chamberlain brought the message of the Golden Rule in business and made a deep impression on every dealer:

"Service in the automotive industry," he said, "means 'get together'; it means that the automotive executive must familiarize himself with other industries, must understand what executives in other lines of merchandising—for this is a merchandising industry—are doing. Service is the most important thing in our business, but not free service, for the automobile dealer who gives something for nothing will very soon find himself with nothing to give. Service means the doing of business with each man as he wants us to do business with him; on the principles of honesty and truth and fair-dealing that we would have him do business with us.

"Don't run down, don't belittle, your competitor. Join the association to which your fellow-dealers belong. Put your business on the same systematic basis as a drygoods or other merchandise-selling institution. Service is the Golden Rule in business. Service in organization, efficiency, co-operation, cleanliness, friendliness, system, and routine, all welded into one. There are three factors which go to make up service: First, yourself, that is, your policy; second, your employees, that is, co-operation, and third, your customers, that is, patronage.

"Policy—your policy—is the establishment of your business on a basis that shall make it a business for your grandson and his son, not merely for yourself, or for the next fifteen or twenty years.

"Co-operation' is the realization on your part that you as an employer, owe as much to your employees, whether they be one or fifty in number, as your employees owe to you. If you meet your employees half way; if you give them clean places in which to work and good tools with which to work; if you let them



Upper Row, left to right—J. K. Dunn, of McComb, Miss., who was elected one of the vice-presidents of the bi-state association; P. E. Chamberlain, of Denver, who brought the message of the Golden Rule in Business to the Southern dealers; C. A. Hausaman, of New Orleans, who tagged everybody with a miniature Firestone tire. Lower—W. H. Daniels, of Gulfport, and C. W. Riegger, of New Orleans, who was elected treasurer; Secretary J. H. Duncan welcomes C. H. Brownell, advertising manager of "Me 'n Henry," who brought a Ford message of optimism to the convention; J. C. Cathey, of New Orleans; L. C. Glenn, of New Orleans

share, each according to his efforts, in your prosperity, you will find they will meet you more than half way.

"Patronage' is the thing by which we all live and prosper, the thing which your policy brings to you. To get it you must train your salesmen to sell service more intelligently, even, than they sell your product. You as a dealer, must be an automobile doctor, capable of diagnosing accurately the ailment of the cars the public brings to you for treatment, and of remedying the ills of those cars, just as you tell the owner they will be remedied, and at the price you tell him he will be charged for the cure. That is service, and there is only one way to get it—'Think Right and Work Hard.'"

Two widely divergent views of the present situation were expressed during the convention by Mr. Kroh and Mr. Brownell. The former's informal talk at the banquet in the Great Southern hotel and his formal address at the meeting in Elks Hall the following day were direct demands to the dealers that they not only by example, but by real action, eliminate the fly-by-night dealer. His subject was "Motorizing the Farmer" and he discussed at length the potential buying ability, now organized, of the 13,500,000 farmers in this country. He declared the supplying of these farmers with tractors and trucks alone would require the attention of every automobile dealer and salesman in the United States for several years.

Wish To Place Road Control In Hands of State Officials

One Result of Gulfport Convention
is Endeavoring to Alter System
Now in Force

GULFPORT, Miss., Oct. 15—As a result of the convention of the Louisiana-Mississippi Automotive Trade Association here the automotive dealers of Mississippi, with the aid of those of Louisiana, will endeavor to obtain the passage of a constitutional amendment at the coming session of the Mississippi legislature, taking control and regulation of the roads and licensing of the automotive vehicles which pass over them, out of the hands of the boards of supervisors of the various counties and placing it in the hands of state officials.

Hitherto, there have been as many laws of the road, license fees and other regulations regarding automotive vehicles and highway use as there are counties in Mississippi, and the motorists, truck users and automobile dealers have grown weary of paying tolls to all these boards of supervisors. The support of the bi-state association was asked and obtained by W. G. Patterson, of Shreveport, La., on receipt of a telegram from W. K. Pate, of Jackson, Miss., who is leading the Mississippi dealers in their campaign for the amendment.

The meetings of the directorate were confined largely to the business of the association and did not concern themselves with the price situation or with other matters of general interest.

The convention closed with the election of officers and a ball at the Coliseum at the Naval Station between Gulfport and Biloxi. The election in which it was Mississippi's turn to name a president, resulted in the choice of R. E. Hines, of Jackson, Miss., over J. H. Hooks, of Clarksdale. George D. Wray, of Shreveport, La., retiring president, was kept away by the serious illness of Mrs. Wray, and neither Mr. Hines nor Mr. Hooks attended the convention. Reuben Brown, of Jeanerette, La., presided, in place of Mr. Wray, and was elected first vice-president. J. K. Dunn, of McComb, Miss., was elected second vice-president; L. E. Barr, of Lexington, Miss., third vice-president, and W. G. Patterson, of Shreveport, fourth vice-president. C. W. Riegger, of New Orleans, was nominated on both tickets, for treasurer of the association, and was unanimously elected. E. H. Simpson, of Jackson, Miss., and R. E. Baugh, of New Orleans, were elected directors for the three-year terms.

At the end of the convention J. H. Duncan, who has been secretary since June, resigned, effective Nov. 1, to enter the automobile industry at New Orleans. President Hines will name his successor.

ATLANTA-MACON TRUCK TEST

Macon, Ga., Oct. 15—A ship by truck demonstration from Atlanta to Macon carried a load of 3,000 lbs. of soap in four hours and nineteen minutes. The same

shipment by rail could not have been delivered the same day and there would have been the charges for transfer to and from the railroad station beside the freight charges. The return trip, on which 2514 lbs. of twine, books and stationery were carried, was made up grade part of the way, and took four hours and thirty minutes. A 1½-ton truck was used and was in charge of K. T. McKinstry.

CLEVELAND PLANS SHOW

Cleveland, Oct. 15—The twentieth annual automobile show of the Cleveland Automobile & Manufacturers Association will be held Jan. 22 to 29 inclusive in the Wigmore coliseum. The customary policy of restricting exhibits to passenger cars and accessories will again be followed.

Because of the large demand for space, notwithstanding the increased area that will be available, officers of the managing organization fear that they will not be able to accommodate all lines of passenger cars that are marketed in the Cleveland district. On account of unusual interest the space for accessories will be enlarged. Activities for the show already are under way. Decorating and other contracts are to be awarded and applications for space put in the mail within the next week.

HAYNES OFFICIALS ON TOUR

Kokomo, Ind., Oct. 15—The Haynes Automobile Co., of this city, is investigating existing conditions of the passenger car market throughout the United States. Three of its executives, S. M. How, general sales manager; J. A. Bonell, assistant general manager; J. A. Gilbert U. Radoye, advertising director and sales promoter, are on extended trips which will carry them into every state of the Union, and into every city of 10,000 population and over. Bankers, business men and newspaper publishers will be consulted as to the passenger car situation. The facts will be noted and the results tabulated for use in the sales and sales promotion departments of that company.

Parenti Motors Corp. Expects to Be in New Plant in November

Buffalo, Oct. 10—The new factory of the Parenti Motors Corp. is nearly ready for occupation. Started late in August work has been pushed so fast that part of the building may be occupied in two or three weeks and all of it in November. It will have a capacity of 5,000 cars the first year.

The first cars carrying the Parenti air cooled engine will be produced in this factory in January and by March the corporation hopes to be in full swing. Louis Vremsak has been placed in charge of the design and building of the bodies and W. O. Warner is handling the designing and building of the special Parenti air cooled engine. At the Pittsburgh show beginning Oct. 16 Parenti cars will be exhibited in three models, sedan, touring and town cars by the Pittsburgh distributor, the Seidner Motor Co.

Governor Wants Dealers to Help Rewrite Constitution

Louisiana Executive Wishes Good
Roads Section of Law to Be
Made Perfect

NEW ORLEANS, La., Oct. 15—Gov. John M. Parker of Louisiana, speaking as the honor guest at a banquet terminating the convention of 160 Ford dealers from all parts of the state here, declared the motor truck and the tractor the most important factors in the development of the state's agriculture, and highly important to its future welfare. Gov. Parker also called on the assembled dealers to devote their energies to sending a number of men of their industry as delegates to the coming convention which is to rewrite the state constitution, so that the good-roads parts of that constitution might be made as nearly perfect as possible.

"To frame an instrument of this kind we should have the best lawyers, the best bankers, the best automobile men, the best farmers, and the most progressive business men obtainable. Hand in hand with this vitally important work comes that of good roads.

"Not only does the value of the land advance rapidly with good roads, but life in the country is infinitely happier and more prosperous when our people are in close touch by automobile with schools, churches, amusements and other modern conveniences."

Governor Parker urged the dealers to "show the farmers what it costs to raise horses and mules up to the age of four or five years; how they eat in rainy weather just the same as in working days; how their expenses and costs go on all the time,

"But," he added, "don't try to sell the farmer something that he does not need. Don't sell him, under any circumstances, any inferior machinery. Insist that your factory furnish only the best and then, when it gets into the farmer's hands, have your demonstrator show him how to use it, and how to care for it, so as to get the best results. Above all, impress upon him the fact that machinery must be cared for, that it must be kept out of inclement weather, that it must be oiled and given every attention. And, with all this, show him that, by the use of the motor truck and the tractor and other modern machinery, he can accomplish two or three times as much work, produce two or three times the crops, and live two or three times as comfortably, as he could by the old mule-power way.

"Your field is very great. Go to it, and accomplish real, substantial results. I foresee the major automotive business in Louisiana and much of the South to be with tractors, because this is an agricultural country, with farmers predominating in our population, and because the banks favor tractor paper above that of the passenger car. With mules at \$830 a pair, as they are now selling, it should not be difficult to place a tractor on every farm in Louisiana."

Concerning Men You Know

George D. Zuver, distributor of Winton cars in Detroit, has been elected a director of the Detroit Automobile Dealers' Association succeeding J. C. Ayers, who has taken over the management of the Defiance Motor Truck Co. at Defiance, Ohio.

M. A. Young has taken over Detroit distribution of the Chandler line of automobiles in connection with Peerless and Allen cars.

C. Floyd Greene, formerly sales manager of the Grant-Lees Gear Co., Cleveland, Ohio, has resigned to become sales manager of the Ohio Motor Vehicle Co., manufacturer of Ferris automobiles. He will be assisted by L. H. Jackman who has recently resigned from the axle division of the Standard Parts Co.

Aaron G. Cohen, Hartford, Conn., has sold out his interests in the Oldsmobile Co. of Hartford. The service station of the company is being moved and the used car salesroom has been discontinued. Mr. Cohen is to take over the old service station and will deal in used cars.

Frank J. Weston, who was formerly secretary of the Gartley-Weston Co., Inc., of Detroit, now heads his own company, the Weston Mfg. Co., of St. Louis, Mo.

T. P. Nickell, for several years service and sales engineer and equipment sales representative of the Splitdorf Electric Co., has recently joined the sales force of the Jenkins Vulcan Spring Co., Richmond, Ind., as special representative. Prior to forming his connection with the Vulcan company, Mr. Nickell was New England branch manager for the Splitdorf company. He is well known among automotive men in the Middle West and has a particularly wide acquaintance in New England trade circles.

J. J. Lake, for sixteen years on Automobile Row, has been appointed sales manager for McShane-Hill, distributors of the Liberty car in Chicago.

G. L. Hudkins, president of the Hudkins Motor Co., Salina, Kans., Ford dealer since the Model T days, has retired to become manager of the Motor Finance Co. of Salina. This company will engage in the time loan business through Ford dealers only.

Bradley Sargent, who has had many years experience in the automobile business on the coast, will be in charge of the direct factory branch of the Chevrolet Motor Co. of California in San Francisco. James B. Ryall is assisting him in the management. C. J. Ramsey is service manager.

Trade Association Resents Statement of Health Officer

Cincinnati, O., Oct. 18—Automobile dealers of Cincinnati have no intention of letting any criticism of the automobile go unchallenged, even if the criticism should come from a city official. Hence a protest was made this week through the Cincinnati Automotive Trades Association against a statement attributed to Health Commissioner William H. Peters.

Dr. Peters was said to have made the statement that the automobile business has become a "menace" and that "drastic action must be taken to curb the speed mania."

"If you will check up progress of the automobile since the beginning of the great war you will find it has aided materially in advancement of health, happiness and prosperity in this country," says a letter written to Dr. Peters by Ralph R. Curl, Secretary of the Automotive Trades Association. "Do you not believe a system of education of the

F. S. Stratton, Detroit sales manager of Packard Motor Car Co., left the service of that company Saturday to join George Hubbs, who recently took charge as general manager of Grant Motors in Cleveland. Mr. Stratton had been with the Packard organization about four years and is one of the best known men in the sales end of the industry. C. F. Green, who has been connected with Packard sales department for one and a half years, is in charge of that department for the time being as acting sales manager.

R. E. Stallings has been elected president of the Logan County, Ill., Automobile Dealers' Association, succeeding F. C. Orton, resigned. A banquet of the association was held Oct. 4 to celebrate its first anniversary.

Don Lee, distributor of Cadillac cars for the California territory, announces that his organization has just passed another high mark. He has just sold his twelve thousandth car and is looking forward to selling 12,000 more.

Thomas Rosin and Harry Green have organized the Gary Motor Sales Co., Chicago, to market Gary trucks in the Chicago territory.

B. C. Helm, formerly special representative of Hare's Motors with headquarters in Philadelphia, has been appointed general sales manager of the company.

O. R. McDonald, sales manager of the automotive equipment division of the Gibson Co., Indianapolis, has resigned, effective November 1. He was formerly sales manager of the same department for the Herring Motor Co. of Des Moines and has been an active participant in some of the most constructive work of the Automotive Equipment Association.

S. G. Andrews, for seven years Saginaw representative of Goodyear, has resigned to take charge of the truck department of the Sutton Sales Co. He will have charge of sales and service on umbo and Reo trucks.

Fred J. Wood and Wilbur St. Cyr, Hartford, Conn., doing business under the name of the Wood St. Cyr Auto Repair Co., are to retire from business on Nov. 1. Neither has indicated plans for the future. The garage and service station occupied by the firm will be taken over by Arthur R. Salisbury, service manager of the Hartford branch of Willys Overland, Inc., which is to be discontinued Nov. 1. Mr. Salisbury will utilize the Wood St. Cyr Building for Overland service.

Police Commissioner Frank L. Ray, Meriden, Conn., has been appointed sales manager with full charge of the new Britain and Meriden branches of Russell P. Taber, Inc.

pedestrian public of the dangers of unthinkingly crossing streets and roads would be of more benefit than statements that the automobile has become a 'real menace'?"

COUNTY SHOW A SUCCESS

Orland, Calif., Oct. 16—The first automobile show of the Glenn county fair, held here last week, proved an entire success. The show was held in a tent, but the decorations were planned to conform and one of the best fair shows of the year was a result. Twenty-five cars were displayed. In the exhibit was the first of the new model Buick to appear in a show room on the Pacific coast.

HARTFORD SHOW LIKELY

Hartford, Conn., Oct. 8—While nothing definite is being said as yet, every indication points to another and larger show for the Hartford Dealers' Association next January. Last year's show made it plain that January is a good month to hold a show. The local attraction will

probably follow about two weeks after the New York event. A number of new members have been admitted to the association so that the exhibit will be larger than a year ago.

HERSEY MAKES TRADE TOUR

Richmond, Ind., Oct. 15—Dwight T. Hersey, general sales manager of the Jenkins Vulcan Spring Co., has just completed a coast to coast trip for the purpose of looking over the field in the interest of the Vulcan company, arranging with jobbers for specialized service in replacement springs and securing first hand information in every part of the country as to the outlook for the coming year.

Mr. Hersey reports a firmly established feeling of optimism in trade circles everywhere. The consensus of opinion, he finds, is that the recent period of temporary depression has served a purpose; it has made plain the necessity of readjustments, tightening of loose methods, clearing away of outgrown and outworn policies and it has afforded time and opportunity for these improvements.

Parts Manufacturers See No Prospect of Reduced Prices

Oshkosh, Wis., Oct. 15—The Wisconsin Parts Co., manufacturers of the Wisconsin custom built axles, see very slight prospect of reducing prices for the next six months. There are practically no materials which can be bought at lower prices, it is stated, and while there is a possibility that steel prices will be reduced, every parts manufacturer must have a large quantity of steel on hand purchased for orders which were held up during the past three months.

Waukesha, Wis., Oct. 14—The Waukesha Motor Co., manufacturers of gasoline motors for trucks, tractors and industrial purposes, will not change their fourth quarter prices. They state that there are no reductions of prices in sight in steel, iron, aluminum or copper; in fact, aluminum forgings have advanced.

POPULARITY OF BUS LINES GROWS

Wilmington, Del., Oct. 17—The Surburban Traction Co. has been chartered under the laws of Delaware to operate bus lines in and around Wilmington. This is the third company to embark in this business recently.

Avondale, Pa., Oct. 14—The People's Bus Line has been operating a bus line out of Wilmington to this place and other points in the state and Delaware plans to operate fifty more buses which it has just purchased.

Philadelphia, Oct. 15—The American Taxicab & Service Co. has applied to the Public Service Commission to operate a fleet of taxicabs and motor buses in this city and the counties of Chester, Delaware, Bucks and Lehigh.

Mr. Druecker Operates a Service Station in Milwaukee and is Very Enthusiastic Over What It Has Done for His Business—
It May Be Just the Thing for You

No bookkeeping by the mechanic is required with this time and work ticket.
Record of the time consumed on each job is checked

Mr. Druecker uses Milwaukee newspapers and class papers to advertise his service. He makes it a point to get reprints of his ads, and sends them to owners.

A Department of BETTER BUSINESS



Conducted by Ray W. Sherman

Let's Start Business Again

If Every Man in the Selling End of the Business Will
Begin NOW and Work HARD We Can Clean Up Exist-
ing Stocks in 45 Days and Make Some Money, Too

IF every man in the automotive business will begin NOW and GO AFTER business we can pull the automobile business out of the doldrums and give it a running start—much the same as we did after the armistice, when business went flat for 60 days and was started solely through the efforts of the dealers.

Here's the situation: Sales started to back up last June when credit began to be restricted. By degrees the "back up" was felt all along the line. It was several weeks before the car factories began to feel it, and it is only now that the full effect of the thing has reached the parts manufacturers.

But at the same time that the "back up" has reached the parts end of the industry there is coming an improvement in the retail end of the business. The credit crisis has been passed and things have been on the up-grade for several weeks, although the movement has not been great.

That the movement has begun, however, means much to the automobile people. The business which gets on its feet the quickest and begins soonest to go energetically after business will have that much of a jump on the rest of the business world. There is no need of waiting until people begin throwing orders over the transom. Probably that day is never coming again; at least, not right away.

Furthermore, for weeks the public has been in a waiting, non-buying frame of mind. It is getting weary with this inactivity. It is ready to DO SOMETHING. Also, it has been expecting price cuts—and prices have been cut. Having read in the newspapers that motor car prices have come down, the public is thinking: "Now that prices are down I'll buy," AND IT WILL BUY ANY GOOD CAR OF VALUE REGARDLESS OF WHETHER THE PRICE WAS CUT.

With these conditions, the time is ripe for a big sales wallop. And here is an added reason: THERE ARE NOT AS MANY UNSOLD CARS IN THE COUNTRY AS SOME FOLKS THINK. An investigation among the factories and dealers discloses that if business were fair, thirty days' selling would clean out all the cars in the United States. But business is NOT fair, wherefore it is best to state that forty-five days of

intensive work should nearly clean out existing stocks.

If we can get again to the condition approaching a shortage it will do much to stimulate buying.

Wherefore, LET'S BEGIN—and begin NOW.

If every motor car salesman in the United States will sell ONE car the result will be wonderful. It will clear up standing stocks. Also GO TO WORK HARD ON THE USED CARS. CLEAN 'EM OUT. If you have to take a slight loss, take it and have it over with. Figure carefully, do the best you can, but CLEAN 'EM OUT.

Wherever you are, call a meeting of your entire organization AT ONCE. Tell them you are going to BEGIN SELLING CARS NOW. Get at your old prospect lists again, pick out the liveliest ones and get after them.

BEGIN MAKING CALLS—AND A LOT OF THEM.

ONE of the strongest factors in the present sales slackening is that salesmen have accepted as truth that cars could not be sold. Thousands of salesmen have been operating in a half-hearted way. They haven't believed cars could be sold. They have been expecting that orders would come flying over the transom "after election" or some other time in the future. If every salesman in the United States will begin TO-DAY to call on prospects and go after orders in a red-hot energetic way we can have a goodly volume of sales inside of ten days.

Resume your advertising. Start circularizing your prospect lists. Have sales meetings every day. Get the live stories of your live salesmen before the entire organization and GET GOING. Why not? Sales mean profits, don't they? Well, let's have some profits!

Just imagine the sales business of all trades in this country. They are all in a slump. They don't realize that the desire to own things is just as strong as ever, and that there is a lot of money in the country. Here is Farmer Jones or Mechanic Smith. Each has \$1000, or part of that amount, lying idle, awaiting the day when the owner will spend it. Both of them WANT a motor car, a piano, a music machine, a new rug, an addition on the house, or a dozen other things. They are undecided what to buy. The first live salesman who gets to them will get that thousand, for THE PUBLIC IS READY TO COME OUT OF ITS SHELL AND BUY.

Who's going to profit most? The salesman who dashes out NOW and gets this money from the almost-ready buyers, or the salesman who waits until Smith and Jones make up their own minds? If we wait for Smith and Jones to make up their own minds they may buy a piano, or a rug, or something other than a car. So, LET'S GET AFTER THE PROSPECTS AND GET SOME BUSINESS.

You can say what you wish, but there isn't any better business slogan for the present month than the supposedly real political motto: "BOYS, GET THE MONEY!"

Let's go—and go hard—and watch the motor car business come back with a wallop that will be as mystifying to the business world as was the sudden come-back of our business in 1919, when the dealers took the bull by the horns immediately after the armistice and made the old animal sneeze net profits.

If the Car Owner Says:

"CAR NO GOOD"

—Ask him why it is not. Prove that he is wrong or does not understand the reason for the car's supposed fault. Don't get insulted and run another car down.

"WAIT A MONTH"

—Find the reason for delay. Get payment on car to be delivered at a specified date or as soon after or before as possible.

"SEE WIFE"

—Make arrangements to take her out in the car. Have car clean inside and out and all the rattles out for she will consider these more than the man will. These have proven successful.

"THE OLD CAR"

—The old car may be good enough at present but soon the working parts will break or wear so they will rattle. The finish will soon be cracked and the glass gone making the car look bad or the owner have it repainted at a high price. The longer he runs the car and the longer he keeps it the more it depreciates. He will get more out of the old car and therefore not have so much in the new one.

"CAR" NONESSENTIAL"

—The pleasure he and his family will get out of it on hot Sunday afternoons. How quick he can go to a store or out in the country after some articles and how many steps it will save in a day.

\$1 For an Idea

What in your mind is the most helpful thing a dealer can do right now to get his sales going?

Give us those ideas. Let's get business started again! We can if we think we can! Motor car men are the liveliest type there is! Let's start!

And let's have some "starting ideas." For the trouble of writing the idea MOTOR AGE will pay one dollar.

Send 'em in!

One Reader Says

When you buy your clothes at the same place from the same salesman for a number of years and you drop in, say tomorrow for a new suit—pick one out unaided and your salesman tells you that the one you picked out will not wear as well as this one which may even be cheaper—nine chances you'll not buy the one you picked out.

This salesman is doing you a service, you have confidence in the fact that he knows what he is talking about, that's why you repeatedly go to him.

In other words—the average car owner

knows little of the car he drives, what he does know is hearsay or catalog information—if the car should break down on the road all the book knowledge will only tend to complicate matters—he then realizes, as I have done, that his knowledge is limited—for the time he is open to suggestions.

It has often occurred to me just why it wouldn't be a good plan for the small town combined garage and machine shop to look over the salient parts of the cars placed in their charge at least once a month.

It wouldn't take much time to detect even the minor troubles and even though that shop didn't get all the repair work, the service would be appreciated and they would get a fair share.

A written report could be sent to the car owner—it might read—

DID YOU KNOW THAT—

Your left front wheel has too much play

Your valve tappets need readjusting

Your springs need lubrication, etc., etc.

At the bottom of this card make a personal appeal about the kind of work this certain garage or shop can do.

The only difficulty of the whole plan would be that it could not be effectively run from a mercenary angle—B.

Getting Sales Tips From the Service Department

HOW many prospects are you getting from your service department? Are the members of your service department who come in contact with owners alive to the fact that every driver or owner of

the car you sell is either a prospect himself for a later model or knows of some one who is contemplating owning a car.

Many times the members of the service department will get such information and make a mental reservation at the time that they will tell the sales manager or give the tip to one of their friends in the sales department, but how many times do they make any record of this, and the thought is soon crowded out of their mind by their own work and the sales department either does not know of the prospect at all or perhaps reaches him after some one else has sold him another make.

An analysis of the sales of twenty-two dealers showed that over 60 per cent of the cars sold were through information obtained by the service department.

The form illustrated is used by Vim motor truck dealers and is a suggestion for making an immediate record of the prospect and provides a means of getting valuable information to the sales department without loss of time.

SERVICE DEPARTMENT PROSPECT REPORT

NAME _____ CITY _____ STATE _____

ADDRESS _____ STREET _____

BUSINESS _____

PRESENT EQUIPMENT, IF TRUCKS, GIVE NO. AND MAKE _____

SUGGESTED BY _____

ADDRESS _____

BUSINESS _____

REMARKS _____

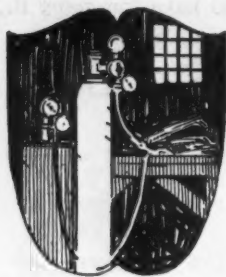
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RETAIN IN SERVICE STATION FILE

FORM 2112 SM 12-19

FORM 2112 SM 12-19

FORM 2112 SM 12-19



Autogenous Welding

What it is and how it is applied



THIS is the fourteenth of a series of articles on autogenous welding. These articles are intended to be of aid to the man who must learn the art of welding with little or no personal instruction. They also are intended as a reference for the man attending a welding school. It is likely that during the first few months of his instruction many problems will come up that may be solved more readily with these articles on hand.

Finally, this service should be of benefit to any automotive service man or repairman, even though he never intends to have a welding torch

in the shop. The reading of these articles will give him an understanding of the subject which should greatly aid him in general repair work. He will be better able to decide, when he has a part to repair, whether it is feasible or not to weld it, and if so, if it will pay. The more familiar one becomes with this art, the wider the scope of its application. The man who is versed in the art will find many clever applications that one who is less familiar with the subject would never dream of. An understanding of welding principles offers a new technique to the repair man.

Part XIV—Examples of Welding a Broken Frame

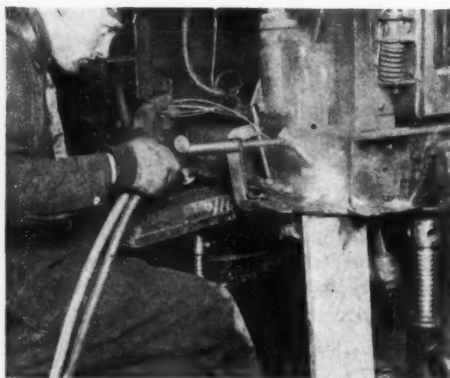


Fig. 42A

THE first point of interest, Fig. 42A, is the method used for supporting the different members. As in the previous case, the frame is broken just above the front spring hanger, which means that the spring cannot be used for

support and that the frame must be supported by jacks. The spring, however, prevents the side frame member from being supported directly. Consequently, it was necessary to place a small channel laid crosswise to the main frame member and lift this channel by two screw jacks.

The head of one jack can be seen and the base of the other jack is visible to the left of the board which is helping to hold the broken piece in place. The use of this board is also interesting. It will be seen that it was sawed to such a length that by jamming it in between an eye beam leading on to the floor and the spring hanger, it was possible to hold the hanger firmly in place. This probably differs from the preceding one in that the spring hanger was not removed from the broken frame member nor from the spring; it is evidently a hurry job.

The alignment of the broken piece is also aided by a screw clamp. The actual

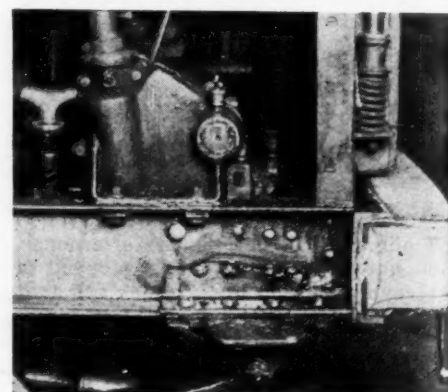


Fig. 42B

welding offers no particular difficulties and is accomplished in the manner described for welding thin metal. The second photograph, Fig. 42 B, shows the finished job.

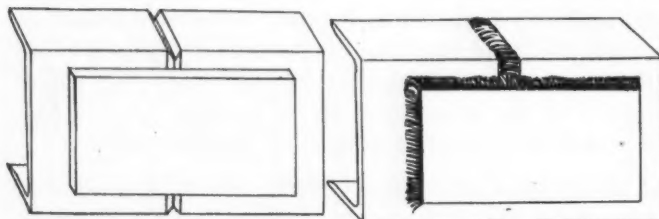


Fig. 43—Reinforcing plate on outside of channel

PREPARE the channel and weld it the same as described previously, then cut a $\frac{1}{2}$ -in. plate 8 in. in length to the right width and place it inside of the channel, Fig. 43. It should be welded on all four sides, starting at one corner and continuing all the way around. Assuming that the channel is $\frac{1}{4}$ -in. thick the welding head, oxygen head, oxygen pressure

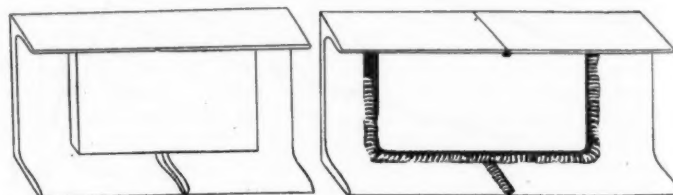


Fig. 44—Reinforcing plate on inside of channel

and welding rod should be selected to correspond. This applies to the welding of the channel. For welding in the reinforcing plate the next larger head and corresponding oxygen pressure should be used with a $\frac{3}{16}$ -in. filler rod. Fig. 44 shows the same job with the plate on the inside. This method is a trifle more difficult but presents a better job.

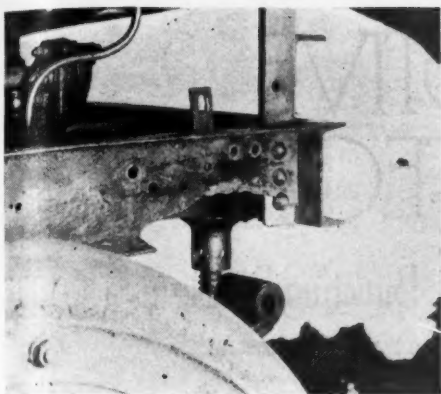


Fig. 45—Broken frame to be welded

FIG. 45 shows a piece broken out of a structural steel channel frame. This brake was probably caused by the stress produced by the front end of the spring, the front spring hanger being riveted to this section of the frame. Before proceeding with this job it was necessary to support the frame by means of a screw jack. The spring hanger was removed from the broken frame piece and then the

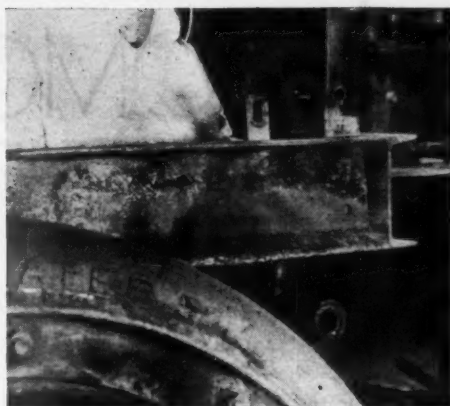


Fig. 46—Showing weld completed

piece was slipped back in place and spot-welded, or tacked at two or three places. This metal is so thin that it is not likely that it was necessary to V it out. The welding was accomplished in the manner described for welding thin steel and offers no difficulties.

The second photograph, Fig. 46, shows how the job appears when completed. It will be noted that the welding has been so skillfully done that it is not easy to detect the break. Asbestos paper covers the engine completely as a fire protection. It would also be a good plan in doing a job of this sort to cover the tire with asbestos paper.

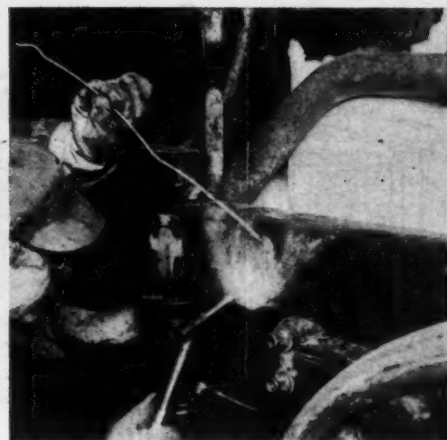


Fig. 47—A good example of frame welding

THIS is an excellent example of welding a broken frame, Fig. 47. It will be noted that in order to make the work fully accessible it is necessary to remove the front running board bracket. It is also interesting to note that the frame to the rear of the break is supported by the front spring.

The position of the welding rod and the torch are worthy of note. Asbestos paper has been placed over the engine as a safety precaution, as the flame from the torch might ignite some of the gasoline oil or grease.

It is important to use a screw jack because it permits of an infinitely fine adjustment. Obviously, such an adjustment could not be obtained with a ratchet jack. The jack shown is the type used by house movers. This type is not essential, however; any screw jack will do.

FORD'S CANADIAN PROFITS

Windsor, Ont., Oct. 14—Profits equivalent to 67 per cent of the \$7,000,000 capital stock outstanding were earned by the Ford Motor Co. of Canada in the year ending July 31. Gordon M. McGregor, vice-president and general manager of the plant, reports that net profits for the year were \$4,696,243 after deducting \$968,590 in business profits, taxes and all other expenses. Dividends amounted to \$1,750,000, leaving surplus on July 21 last at \$8,216,305, compared with \$5,270,061 as of July 31, 1919. The showing is made on a production of 55,616 cars, exclusive of tractors, as compared with 39,112 manufactured the previous year, and 75,000 to be produced the current fiscal year.

FRIENDLY SUIT BROUGHT

Huntington, Ind., Oct. 14—The Rapid Rim Co. of this city, which is practically ready to begin the manufacture of patented rims, piston heads, piston rings and other automotive parts, has gone into the hands of a receiver on petition of forty-six stockholders of the company. E. E. Allen was appointed receiver by Judge George M. Eberhardt of the Huntington Circuit Court. The suit was a friendly one and was brought for the purpose of giving the stockholders time to reorganize and finance the company. The total indebtedness is said to be about \$92,000.

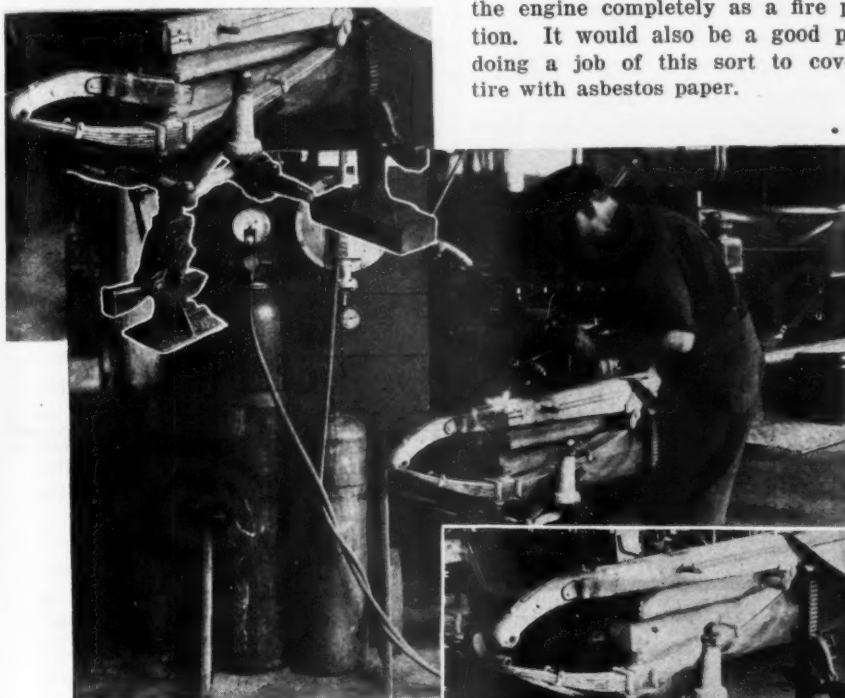


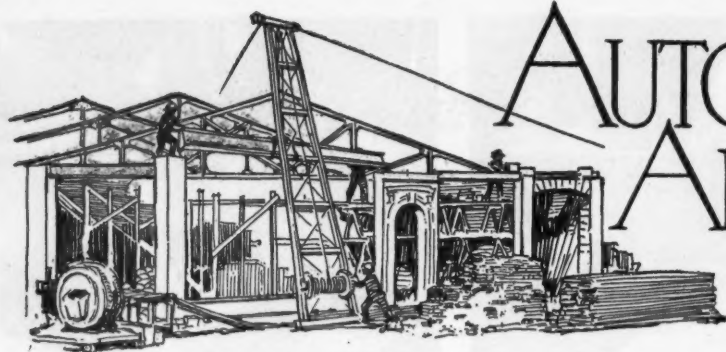
Fig. 48—Three views showing the weld of a broken frame by use of the outside patch

THIS shows a quick job on a broken frame. A patch, as shown in the top view, consisting of a flat piece of steel has been applied to the outside of the frame. This, of course, will not make as neat a job as if the patch were on the inside or if no patch were used, but it is strong and easy to apply. At the same time it is sufficiently hidden by the fender so that it is hardly noticeable.

In the middle view is shown how the patch was welded to the front section of

the frame and then welded to the rear section. The method employed is exactly that described for applying an outside patch to a channel section, as previously described. The discussion of the jacks is of interest.

It will be noted that it was only necessary to remove the hood, radiator, left fender and left wheel in order to do this job.



AUTOMOTIVE ARCHITECTURE

Planning and Building Problems

CONDUCTED BY TOM WILDER

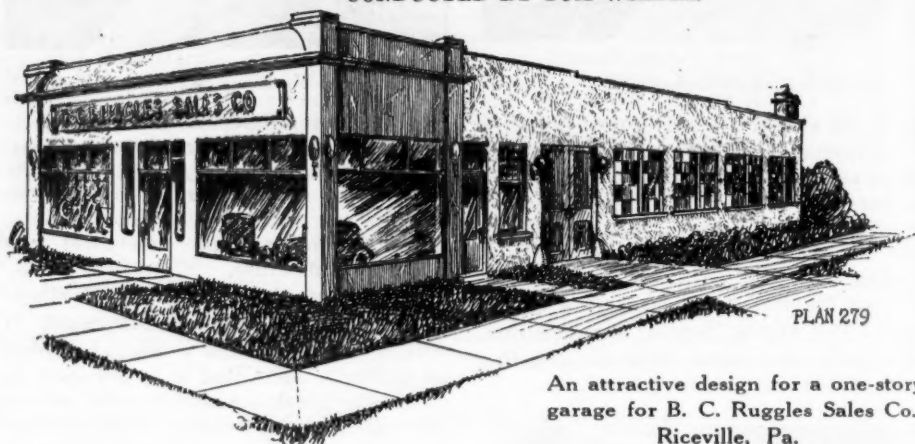
No. 278

TAKING ADVANTAGE OF GOOD FRONTAGE

We are erecting a garage 75 by 100 ft. and would appreciate plans showing an arrangement that will save time and space. The shop will be 20 by 115 ft. and we intend working four men in the repair shop. We want the show room large enough for the display of two cars with the office, parts and accessories in the same room.—Bryant-Burke Motor Co., Grandfield, Okla.

You are not taking advantage of your opportunities when you discard your corner for display purposes and use your front for car entrance. Your 75 ft. front could be put to much better use as an accessory store, office and show room for cars with an unbroken stretch of plate glass extending across the front and a short distance around the corner.

If the big end of your business is car sales, the cars should be displayed in the corner where they can be seen from both streets. However, if you make more profit from tire and accessory sales,



PLAN 279

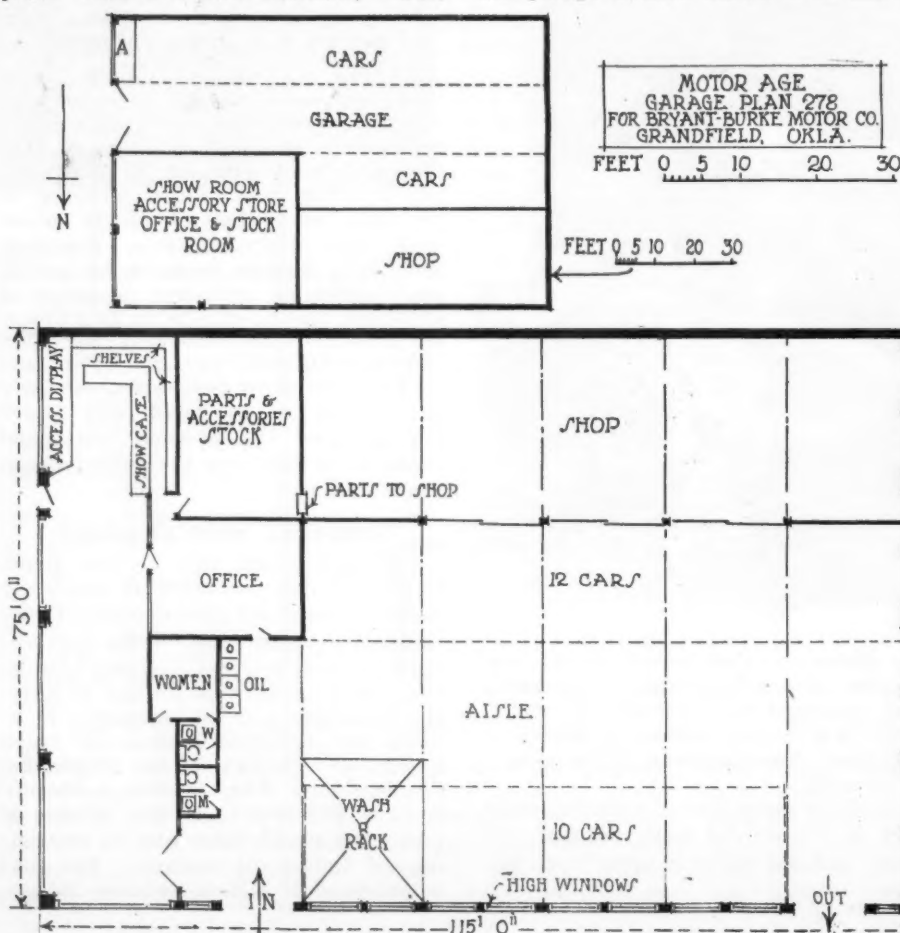
An attractive design for a one-story garage for B. C. Ruggles Sales Co., Riceville, Pa.

perhaps it would be better to give the corner display space to them.

Your letter and diagram do not agree in that the diagram shows the shop across the back end of the building. Since a 50 ft. space is the most economical for car storage, we believe the shop and garage division shown of 25 and 50

ft. respectively, would give the best results.

The small diagram at the top shows an arrangement with front entrance and the show room, accessory store and office worked into the north half of the front. An accessory display at A would improve the front and stimulate business.



IN this department MOTOR AGE aims to assist its readers in their problems of planning, building and equipping service stations, garages, dealers' establishments, shops, filling stations and in fact any buildings necessary to automotive activity.

When making requests for assistance please see that we have all the data necessary to an intelligent handling of the job. Among other things we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.



Left—Exterior view of Ford sales and service station planned by Motor Age for the G. C. Pratt Motor Co., Pryor, Okla. Steel sash is used around the entire building, insuring a well lighted interior

Motor Age planned this sales and service station. What are your building problems?

Below — Interior view showing the shop, which is equipped to do complete overhaul jobs

G. C. PRATT MOTOR CO.
Ford Automobiles and Fordson Tractors

Pryor, Okla.

Motor Age,
Gentlemen:

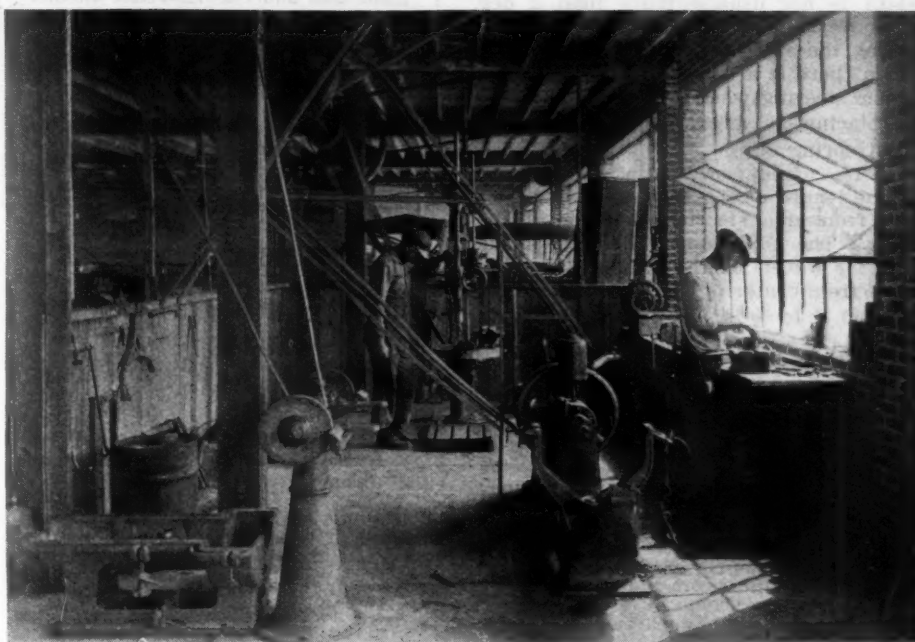
We are enclosing two pictures of our new place which we built in accordance with plans furnished by Motor Age, one inside view of the shop and one outside view.

Our building is 50 by 150 ft. We have used steel sash entirely around the garage and shop space and also have skylights, which insures us plenty of light at all times, also ventilation.

We are Ford and Fordson dealers for this territory and have installed in the shop about every piece of service machinery necessary to make a 100 per cent overhaul job on either the Ford car or Fordson tractor. The following are some of the inside dimensions:

Showroom 50 by 40 ft. Parts room 20 by 40 ft., garage space 50 by 70 ft. Shop 30 by 50 ft.

Yours,
G. C. PRATT MOTOR CO.,
By G. C. Pratt.



No. 279

HOLLOW TILE BEST FOR ONE STORY GARAGE

The plans you sent were given to our architect and have never been returned. Plans now contemplated are for a building one story high approximately 50 by 80 ft. for sales and service only, as we now have on this lot a building for storage with 6,400 ft. of floor space. We want the shop in the rear, entrance on east side with general layout as you indi-

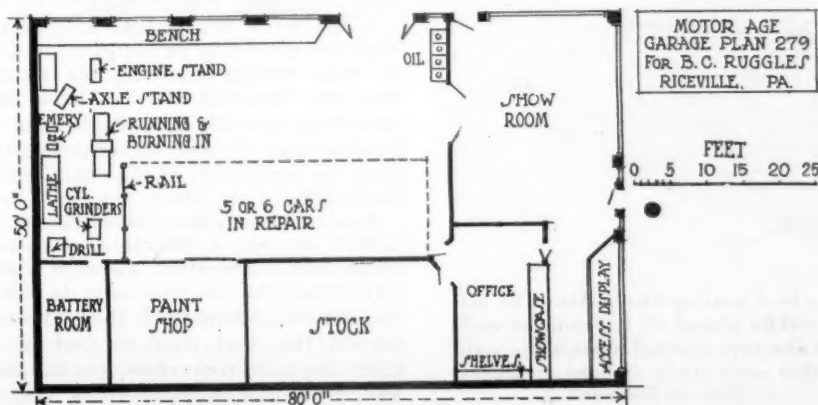
cated in first plan. It is contemplated using reinforced concrete made of hollow blocks for the building material. This is made under a patented process new to us but recommended by the contractor. Do not recall the name of the company controlling this business, but would like your opinion on this material.

We are giving you a new plan to conform with the conditions set forth in your letters and are also showing a perspective drawing viewed from the corner.

In regard to your concrete construction. No doubt it is alright, but we have no idea what it might be. There are so many schemes brought out and patented that it is impossible to have knowledge of them all.

We believe that in your section of the country, hollow tile would be cheaper and just as good for a one story building. The solid back walls of this building could be erected very quickly, at slight labor expense and face brick could be used on the street sides. Buildings of several stories are the ones especially adapted to reinforced concrete. There is no special advantage in reinforced concrete for walls. Walls built of bricks laid one upon another, have stood for centuries, but in buildings of several stories, reinforced concrete is ideal for columns and floors.

We would advise investigating the cost pretty thoroughly before adopting this system. It may run into labor excessive and nowadays labor should not be experimented with. If we knew just what the scheme was we could advise you more intelligently, but all we can say now is "be careful."



The Readers' Clearing House

Questions and Answers

"CAMBER" AND "TOE IN"

Q—State how much the ends of the front axle, on an Overland 4, should be tipped back to make easy steering.

2—Advise method of towing-in front wheels.—H. X. Melin, Galva, Ill.

1—We shall assume that you refer to the "cambering" of the front wheels. "Camber" of the front wheels is for the purpose of making steering easier. It means that the wheels are closer together at the bottom than at the top and the slant is not usually more than 2 deg. This is usually done at the factory by tilting the steering knuckle. Sometimes when there is a decided whipping action of the steering wheel it can be overcome by placing an angular plate under the front spring clip.

2—The amount of "toe in" is regulated by the length of the steering knuckle tie rod, from one steering knuckle to the other. The adjustment should be made with the wheels on the ground. The distance from center to center of tire should be from $\frac{1}{4}$ to $\frac{3}{8}$ -in. less in front of wheel than at the rear. This amount is usually increased as the steering knuckles become worn.

FOCUSING HEADLIGHTS

Q—Can the main bearings on an 8-cylinder Oldsmobile car, model 44, be taken up without disassembling engine?

2—How is the silent chain which runs the generator and fan on a model 44 Oldsmobile tightened?

3—What method is provided for focusing the headlights on the same car?—Harold Denney, Ogden, Iowa.

1—The technical department of the Olds Motor Works states that it is very difficult to take up the bearings without disassembling the two halves of the engine. We believe that better results will be obtained if the engine is taken down and besides, the job will be much easier to handle.

2—The only way the chain used for driving the generator can be tightened is by raising the generator. Good results

CONDUCTED BY ROY E. BERG

Technical Editor, Motor Age

THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by someone else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.

Miscellaneous

can probably be obtained by placing a few shims under the generator.

3—To obtain the best results for all around purposes, measure off a range as shown in Fig. 1. The car should be placed 40 ft. from the wall and the rays focused against the wall so that each circle of light measures 3 ft. in diameter. The edges of these circles should just touch each other in the center as shown. The lower edges of the circles should strike the wall $1\frac{1}{2}$ ft. from the floor.

To make these adjustments it may be

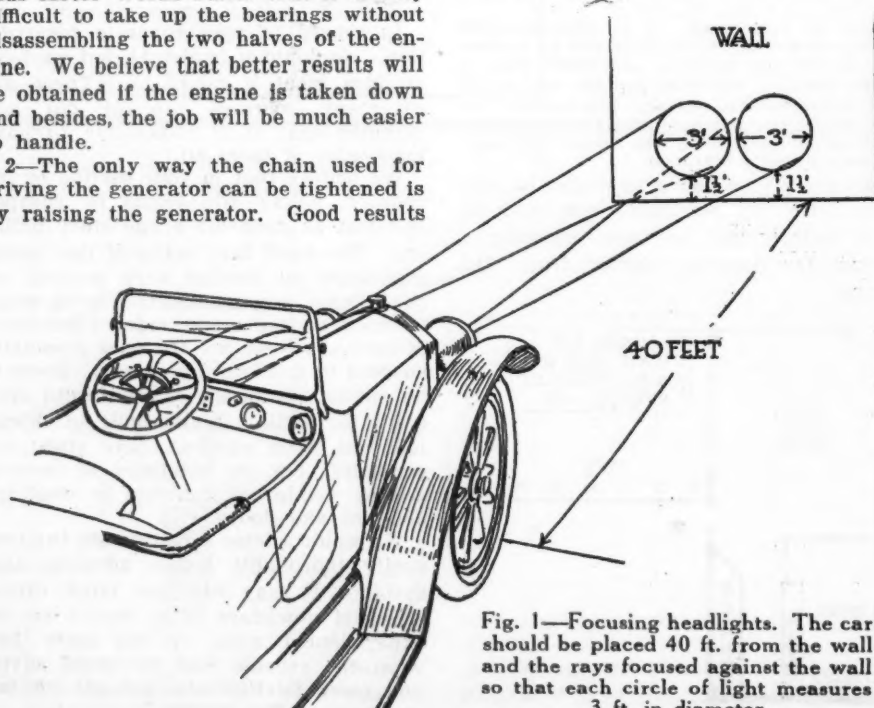


Fig. 1—Focusing headlights. The car should be placed 40 ft. from the wall and the rays focused against the wall so that each circle of light measures 3 ft. in diameter

necessary to bend the brackets slightly or perhaps the tie rod will have to be bent. We do not know just what adjustment is provided for the bulb but the circle of light can be controlled to some extent by moving the position of the bulb relative to the reflector.

SPEEDOMETER GEARS

Q—State the correct size of road wheel, fibre pinion and gear ratio of swivel joint for a Stewart speedometer with a 34 by 4 tire.—Auto Repair & Welding Co., Raleigh, N. C.

The ratio of gears for a speedometer that is driven from the front wheels is determined by doubling the tire diameter. This gives the number of teeth necessary in the road gear. In your case there would be sixty-eight teeth in the road gear. The pinion gears used in all Stewart speedometers are the same size and for front axle drive have 16 teeth. The drive is through a $2\frac{1}{2}$ to 1 swivel joint.

CHANDLER ADJUSTMENTS

Q—A 1917 Chandler is to be overhauled in the near future. The cylinders are to be rebored and the compression of the engine changed. Would you advise lowering or raising the compression which can be done by raising top of the piston heads or lowering same. Is it advisable to change the compression due to the low grade of fuel on the market at the present time? Explain how this is done. The engine has 45 lbs. of compression now. Is this sufficient?

2—Is there any way to take up the slack in the time shaft chain on the front end of the engine?

3—The car is equipped with a Stromberg carburetor which loads up when the throttle is opened a little too quickly. How can this trouble be remedied? A hot spot manifold can be purchased for this engine for about \$15. Do you think it would help the carburetor trouble? Also would sufficient benefit be derived from it to pay for its cost?—G. E. R., Bucyrus, Ohio.

1—A compression pressure of 45 lbs. is rather low as most of the engines are operating on about 65 lbs. If a change is to be made we advise increasing the compression as it will give more power. Instead of planing off the block or attaching a piece of metal to the top of the pistons we advise fitting new pistons with a slightly higher head.

2—Each of the chains are provided with an offset link as indicated in Fig. 2. If wear occurs allowing the chain to elongate $\frac{3}{8}$ -in., it can be taken up by removing one of the offset links. In making this change it is necessary to have the elongation of the chain equal to the length of the offset link.

3—Our records show that this car was equipped with a Rayfield and not a Stromberg carburetor. There is a possibility that the vacuum tank is causing the trouble instead of the carburetor. Should the float stick or leak it will allow the tank to overflow, and the engine will draw raw gasoline into the inlet

manifold. We advise readjusting the carbureter and examining the vacuum tank to see that it is in correct working order.

A hotspot will certainly help conditions a great deal particularly in cold weather. However, the hotspot should be so constructed that it can be regulated. The report of the S. A. E. shows that a hotspot is desirable at speeds below 800 r. p. m. but above that speed there is enough heat to provide a very fair mixture. We advise installing a hotspot and feel sure that it is well worth the investment.

REBUILDING PAIGE

Q—Instruct how to install double ignition on a 1917 Paige car equipped with a Continental engine. Can the priming cup plugs be reamed out and threaded for the extra plugs?

2—Can a Bosch two-spark magneto be used?

3—What would be the result of enlarging the exhaust ports and valves? Would this increase the gasoline consumption? Do not want to increase the gasoline consumption but decrease instead.

4—Will aluminum alloy pistons and connecting rods work properly in this engine or would other light metal pistons and rods be better?

5—Can a Claudel carburetor be used with this engine?

6—Give a list of concerns who manufacture a hot spot manifold for old cars.—Allan Church, Paris, Mo.

1—The priming cup plugs can be reamed out and threaded to accommodate the extra plugs. This will give you two plugs side by side. It will be necessary, however, to supply current to each set of plugs and this will require some extra equipment.

2—If you intend to use a magneto it would be advisable to install a two-spark magneto.

3—Enlarging the intake valves will increase the gasoline consumption but simply enlarging the exhaust valves will have no very noticeable effect.

4—In the previous question you state that you wish to decrease the gasoline consumption rather than increase it. If you install lighter pistons and connecting rods you will undoubtedly increase the engine speed and that will mean greater gasoline consumption but, of course, will be offset to some extent by the use of double ignition and you will get more power.

5—Yes.

6—J. S. Losee, Hebron, Ill.; United States Vaporizer Co., 216 State St., Boston, Mass.; Kant-Miss Spark Plug Co., 370 Vinewood Ave., Detroit.

CARBURETERS

AIR WASHER

Q—On a model D-45 Buick, could all the air, taken into the carburetor, be drawn through water to keep road dust out of the combustion chamber?—D. C. Slick, Granite City, Ill.

Air washers have been used on tractor engines for a long time and there is no reason why an air washer cannot be applied to any car as well. The air intake of the carburetor is one of the sources from which dirt gets into the engine and a means of preventing the dirt from getting into the cylinders ought

Where You Will Find Your Answer

TO assist readers in obtaining as a unit all information on a certain subject, MOTOR AGE segregates inquiries in this department into divisions of allied nature. Questions pertaining to engines are answered under that head and so on.

Miscellaneous

H. X. Melin.....Galva, Ill.
Harold Denney.....Ogden, Ia.
Auto Repair & Welding Co. Raleigh, N. C.
G. E. R.....Bucyrus, Ohio
Allan Church.....Paris, Mo.
D. C. Slick.....Granite City, Ill.

Carbureters

G. N. Garnett.....Unionville, Ia.
H. P. Davis.....Iowa Park, Tex.

Electrical Systems

H. H. Clayton, Hearn's Garage.....Lewisville, Ark.
Geo. J. Dechant.....Chicago
C. F. Grimes.....Kansas City, Mo.
Erwin A. Carpenter.....Seattle, Wash.
Peter Johnson.....Ajo, Ariz.
Milbrook Garage.....Milbrook, Ill.

Engines

D. C. Slick.....Granite City, Ill.
A. N. Becker.....Chenoa, Ill.
E. C. Burt.....Chicago
Harold A. Hoack.....Sterling, Ill.

to be provided. It is also very advisable to use a gasoline filter to remove the dirt from the gasoline before the gasoline enters the carburetor.

TILLOTSON TOP ADJUSTMENT

Q—An Overland model 85-4 equipped with a Tillotson carburetor is hard to start but when a small wire is inserted in the air opening over float of the carburetor and by pressing down on same until gasoline comes to the top of this reservoir, the engine starts easy. After started the engine runs fine unless running slow on high at about 7 or 8 m. p. h. then the car jerks like engine is missing a stroke at intervals. What is the trouble?

2—Instruct how to set the Tillotson carburetor.—G. N. Garnett, Unionville, Iowa.

1—Hard starting is probably due, in some measure at least, to poor carburetor adjustment. The intake manifold is rather long and there is no doubt considerable condensation. There is also a

possibility that the vacuum tank is not working properly. The fact that the car jerks when running at a low speed might indicate loading of the manifold and very likely poor condition of the valves.

If the valve stems are badly worn so that they spin, air will be taken in directly through the valves and jerky action will result. It is interesting to note that under ordinary conditions when the engine is running at low throttle, is not provided with a hotspot of any kind, and the intake passage is long, there is liquid gasoline in the manifold instead of a gas. We advise adjusting the carburetor and installing a hotspot if possible.

2—A cross-section view of the Tillotson carburetor is shown in Fig. 3. Before making any adjustments whatever

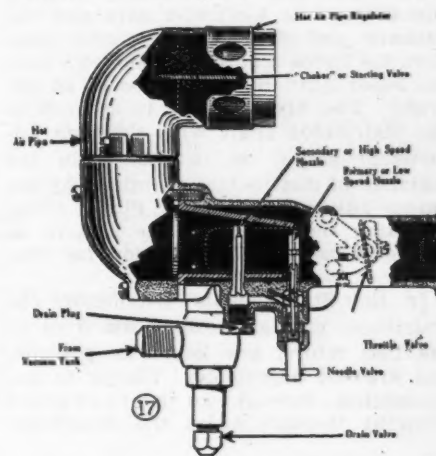


Fig. 3—Tillotson carburetor cross section

be sure that the fault is at the carburetor. There is but one adjustment provided and that is the needle valve, indicated in the diagram. This carburetor is automatic in action. Instead of the usual spiral spring valve, this carburetor is equipped with a tension spring valve, self-regulating.

When adjusting the needle valve it is best to turn the valve to the right until it is completely closed and then back it off about $\frac{1}{8}$ of a turn.

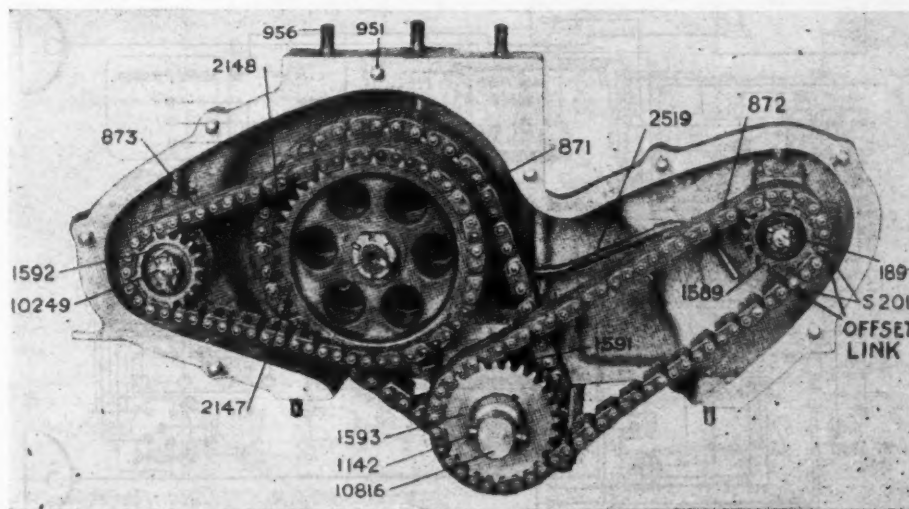


Fig. 2—Showing the time shaft chains on the 1917 Chandler

ELECTRICAL SYSTEMS

CADILLAC WIRING

Q—Publish wiring diagram of the 1914 Cadillac.

2—Publish diagram of the internal wiring of the motor generator on a 1914 Cadillac.—H. P. Davis, Iowa Park, Texas.

1—The wiring diagram of the 1914 Cadillac is shown in Fig. 5.

2—See Fig. 4 for the internal wiring of the generator on a 1914 Cadillac.

IGNITION TIMING

Q—Publish the ignition timing of all the eight and twelve cylinder cars.—H. H. Clayton, Hearn's Garage, Lewisville, Ark.

The Cadillac, Cunningham, Daniels and Oldsmobile 8-cylinder cars and the Packard and Haynes 12-cylinder cars have the Delco ignition system. To time the Delco ignition system proceed as follows: The breaker cam is secured to the distributor shaft with the cam adjustment screw, as in Fig. 6 in the majority of distributors, in others by the timing adjustment screws, Fig. 7. The adjusting screw permits the cam to be placed in any angular position for timing.

In the Stutz double distributor, the distributor cam and collar, which carry the two rotors, are keyed in position, and are not adjustable. Timing is accomplished through an adjustable coupling through which the distributor

is driven. Place the spark lever on the steering wheel in a position one-third advanced. Turn the engine by hand until the piston in No. 1 cylinder is just on top dead center on the compression stroke.

Loosen the timing adjustment screw in the center of the cam, and locate the proper lobe of the cam by turning the rotor until the rotor bottom comes under the high tension terminal of the distributor head connected to the No. 1 cylinder. Locate this lobe of the cam so that when the back-lash in the distributor gears is rocked forward the timing contacts will just close.

The distributor shaft always rotates in a clockwise direction when viewed from the top. Tighten the adjusting screw and replace the rotor and distributor head. Although the appearance of the different combination lighting and ignition switches may vary, their internal construction and operation in controlling the charging, ignition and lighting circuits is quite similar.

On those cars whose equipment does not include a cut-out relay the ignition switch controls both the charging and ignition circuits, through the same switch lever. In these cases, therefore, the ignition switch completes the cir-

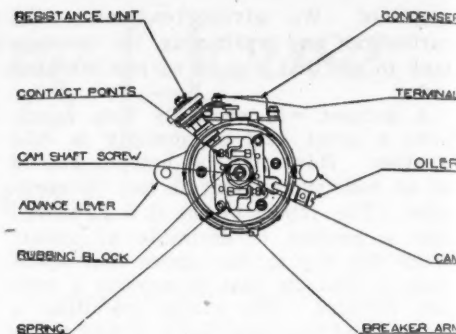


Fig. 6—Delco distributor breaker mechanism

cuit between the storage battery and the generator. It should, therefore, always be in the "Off" position, except when starting or when the engine is running, as otherwise the storage battery would discharge through the generator windings and ignition circuit.

Cars not equipped with two large and two small headlight bulbs carry a dimmer resistance unit on the back of the switch. Practically all switches carry the circuit breaker on the back of the switch. The majority of ignition switches carry the circuit breaker on the back of the switch.

To time the ignition on the Atwater Kent system on the King 8-cylinder car first be sure that all advance control rods and electrical connections are complete. Note that the advance control rods are so adjusted as to allow a full movement of the distributor for the full movement of the advance lever. Then with the starting crank bring the piston in No. 1 cylinder to upper dead center on the compression stroke. This is done easily by opening all priming cups to relieve compression in other cylinders and by holding left thumb over No. 1 priming cup to distinguish between compression and exhaust stroke.

The position of the spark advance lever on the steering wheel sector should be within $\frac{1}{2}$ in. of full retard, and the connecting levers should be such as to give the Unisparker a full movement of 25 to 30 deg. for the full range of spark advance. In other words, the spark advance lug on the contact maker should have from $\frac{7}{8}$ to 1 in. movement.

Now, with the Unisparker in position, the spark lever properly connected up, and with the engine on dead center the Unisparker should be turned backwards or counterclockwise until the contact points commence to open, at which instant the spark occurs. At this point it should be "set."

In timing the ignition turn the crank until No. 1 cylinder is on the top dead center preparatory to descending on power stroke. Then remove the distributor block. Arrangements should now be made for advancing the spark. The projecting lug or arm on the contact maker base should be connected up to the spark advance mechanism. In arranging for the spark advance be sure that sufficient movement is given to the distributor base. It may be necessary to change the lever or arms in order to

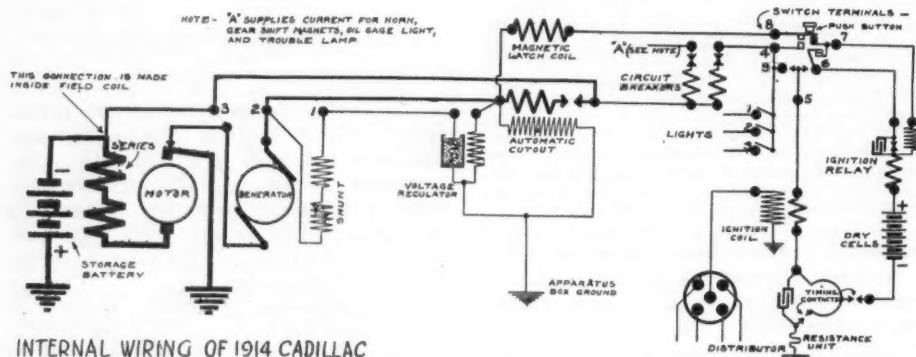


Fig. 4

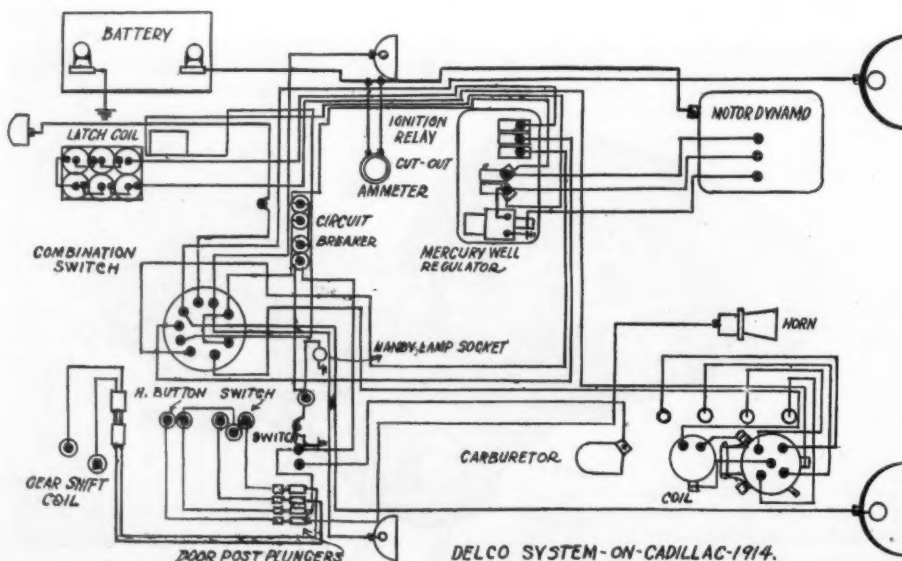


Fig. 5

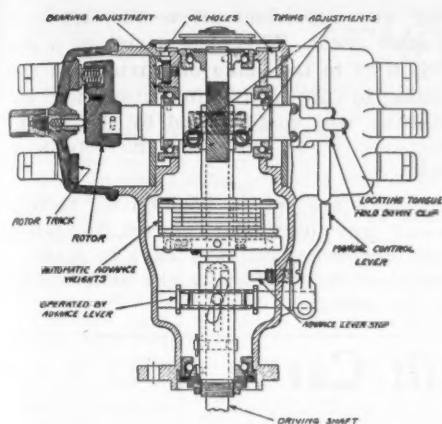


Fig. 7—Sectional view of Delco distributor showing adjustments

obtain sufficient movement for best results.

In some cases it may be found necessary to reverse one of the arms on the mechanism now on the car, in order to keep the movement of the spark lever at the steering wheel in the same direction for advancing. It is not necessary to make this change but might be advisable. Under all conditions, however, be sure to arrange the mechanism which connects to the distributor base for advancing and retarding the spark, so as to give sufficient movement to the base and also that the movement be regular.

The distributor base has a projecting arm, with a hole in it, for connecting to the advance mechanism. To obtain the necessary movement of this base, measure the movement of the arm at this hole. For all engines, except twelve cylinder, the total movement should be $1\frac{3}{4}$, about 40 deg. On a twelve cylinder motor it should not be more than $1\frac{1}{2}$, about 33 deg. This movement, of course, varies with different types of engines and judgment should be used to obtain best results. Do not judge by the amount of movement obtained on your old system.

Advance the spark lever at steering wheel about one-third of the way from full retard. Revolve contact maker shaft at coupling in its forward direction until the contact plunger drops off the end of the cam tooth. This is the point at which the spark occurs. The cap screw on the coupling should now be drawn up tightly. Be sure that this does not move as you are tightening the screw.

The back of the cam tooth should be resting against the side of the plunger, if the timing has been done properly. If it is not, repeat the operation until this condition exists. Replace the distributor block and note which terminal in the distributor cap is directly over the forward end of the distributor blade.

This is the terminal connection for the secondary wire to the spark plugs in the No. 1 cylinder. Wire the rest of the terminals in the order of their firing. Do not run the secondary wires in a fibre tube. A metal tube may be used if desired.

HUDSON WIRING DIAGRAM

Q—Publish the wiring diagram of the Delco system used on a Hudson 6-54.

2—Explain why there is no action on

the starting motor armature shaft when you press on the starter button.—C. F. Grimes, Kansas City, Mo.

1—Shown in Fig. 9.

2—Trouble of this kind can usually be attributed to poor contact at the switch or loose connections. We advise checking the wiring, the starting switch and the battery.

STARTER TROUBLE

Q—An Apple electric starter on a 1916 six-cylinder Herff-Brooks car is giving trouble. There is no loose wire or burnt spot and test shows there is current to the starter. Installed an Eveready 12-60 battery and the starter turned about 1 in. The starter has three terminals. What is the cause and remedy?

2—Publish wiring diagram.—George J. Dechant, Chicago.

1—The important connection of this system is made at the starting switch. We advise first of all, going over the wiring carefully to see that all connections are tight and correctly made. See

that the contacts of the starting switch are clean. Examine the commutator, clean if necessary and be sure that you are getting good brush contact. If the mica is high it will be necessary to cut it down. Refer to Fig. 10.

By removing the screw B the cover C can be removed and the commutator is readily accessible for inspection and cleaning. The commutator surface should be clean and bright, and if found to be blackened or rough, should be polished and smoothed down with fine sand paper. The brushes are of a special copper carbon compound of low resistance. The brush should be kept in perfect contact with commutator and should not stick in the brush holder.

If necessary, carefully clean brush

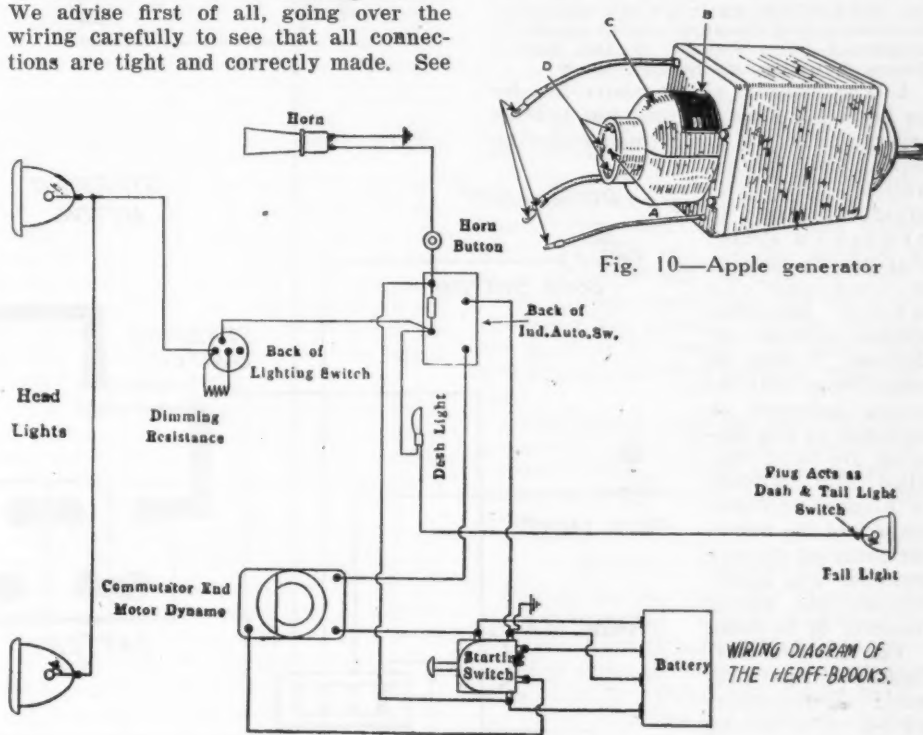


Fig. 8—1916 Herff-Brooks wiring diagram

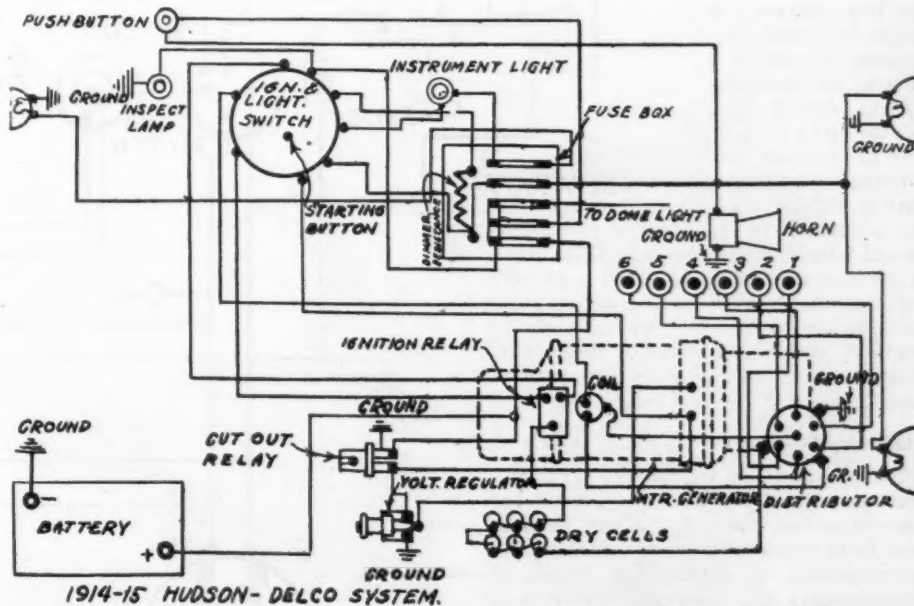


Fig. 9

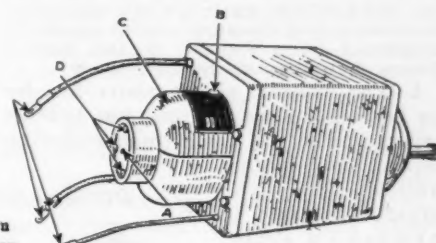


Fig. 10—Apple generator

and holder, removing all dirt and grease. Partially removing the three screws D at the end of the motor generator the brush holder can be revolved making the two lower brushes accessible. After the wires connecting the brushes to the brush holders have been disconnected, the brushes can be removed without disturbing any other part. Care should be taken to replace the brushes in their original position by having the same arrow on the brush holder in line with the mark on the body casting.

2—The wiring diagram is shown in Fig. 8.

STARTER INSTALLATION

Q—Instruct how to install a starter generator on a 1914 Pathfinder equipped with a 4-cylinder Continental engine.

2—What make of starter generator would prove most satisfactory?—Peter Johnson, Ajo, Ariz.

1—Since we have no detailed layout of this car it is impossible to state just how the installation should be made. The necessary steps to be taken when install-

ing are dependent upon the type of starter used. When you arrive at a decision as to the make of starter you are going to use full information for installing will be furnished by the manufacturer if you will state the details in full.

2—We are in no position to recommend any particular electrical system and, therefore, you will have to make a decision by considering the adaptability of the system to your car.

Wiring Diagram for Custom Built Car

Q—I am having a car built and desire to have all the lights connected with individual switches excepting the dash and tail light, which will be in series, and the headlights and dimmers, which are to be connected at a switch on the dash.—Erwin A. Carpenter, Seattle, Wash.

1—The diagram shown above has for its basis the Bijur starting and lighting system, using the Bijur combination ignition and lighting switch. This diagram represents in general a system that can be used in wiring any car where individual lighting circuits are desired. It must be remembered that the points indicated as switches on this diagram are to be supplied with switches of some individual make and the manufacturers of these switches will gladly furnish the wiring diagram to be used.

For the two cowl lights we have provided an individual switch to be located on the dash which will permit having the lights on or off, as you choose. It might be found convenient to supply a switch as indicated by the dotted lines in the diagram, locating the two junction boxes so that it will be possible to cut out the entire set of rear lights should some trouble demand this. It is of decided advantage to be able to turn out the dash light when passing other cars, so we advise purchasing a socket provided with a pull chain or some other means of putting the light out without interfering with the tail light.

Diagram Is General

This diagram is, of course, very general and should you desire to change the connections so the circuits can be handled from one switch on the dash it will be necessary to purchase a switch to accommodate this condition, which is to be wired according to the recommendations of the manufacturer.

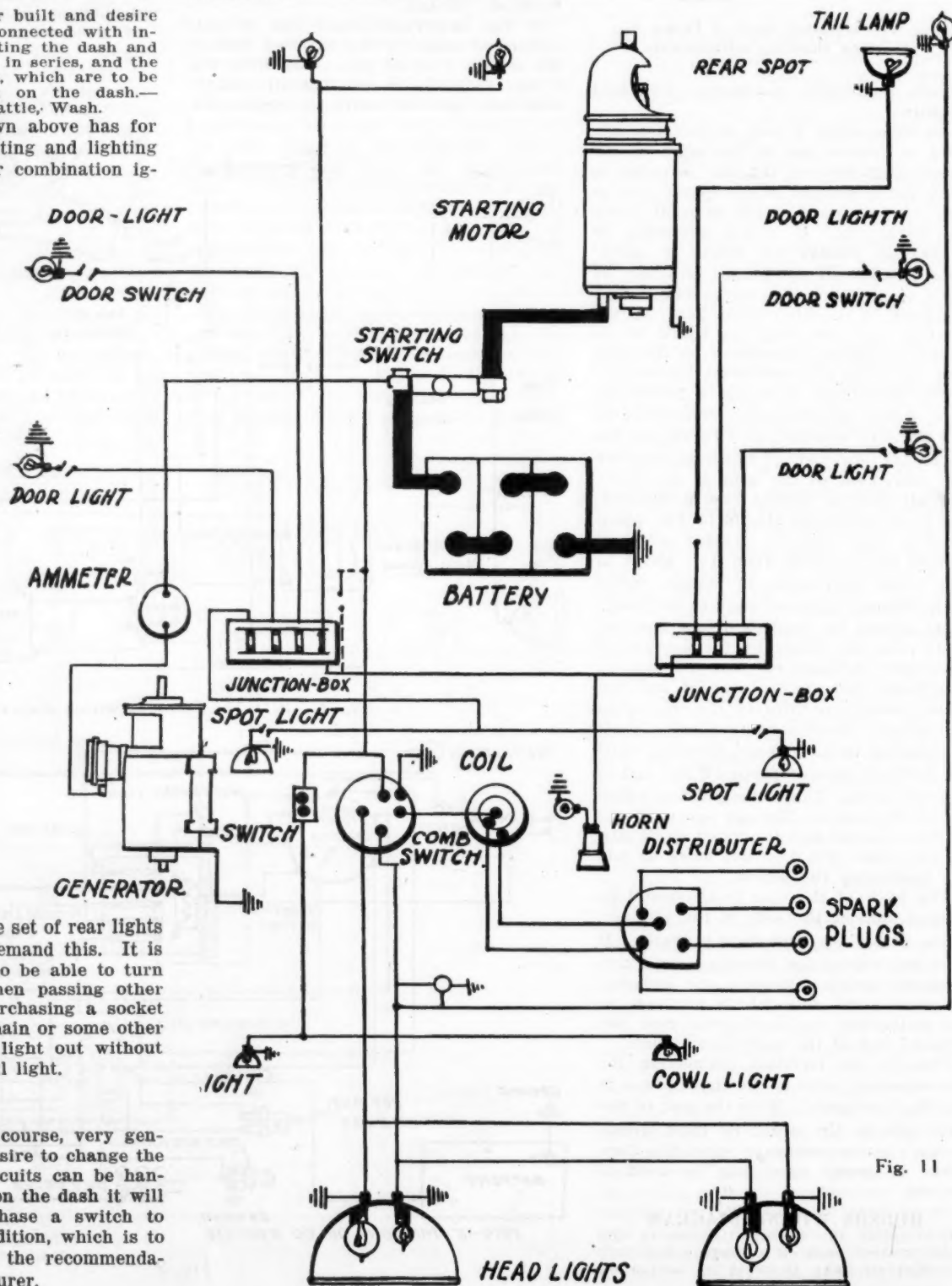


Fig. 11

ENGINES

NOISY TIMING GEARS

Q—What causes a grinding noise, apparently in the timing, in a model D-45 Buick when running at 15 to 18 m. p. h. high gear? At other speeds it is not noticeable.

2—How can one determine if there is a loose wrist pin, a broken piston ring, or a piston slap?

3—Where can I purchase oversize pistons for this model?

4—I am planning to have the cylinder block rebored and to fit new pistons and rings, with no clearance, wearing them in gradually. Would this mean a quiet engine with good compression?—D. C. Slick, Granite City, Ill.

1—This undoubtedly is a case of noisy timing gears and we believe it is present at all times but probably more noticeable at some speeds than at others. This seems to be a general characteristic of Buick cars that have the timing gears in a separate housing and lubricated with heavy oil. Some service men say it is due to wearing of the front main bearing, which permits the crankshaft to raise slightly and thus force the gears into too tight a mesh.

2—The best method of determining whether you have a loose wrist pin is to remove the piston and connecting rod and make the test on a bench. However, there is a method which may be used while the engine is running at idling speed. Short circuit the spark plugs one at a time which will cause the engine to miss. If there is a loose wrist pin it will produce a very noticeable knock. The piston slap will be rather hard to locate but if you find that a slight metallic knock is being produced which increases as the car is placed under pull you can be sure it is first worn or broken piston rings or worn pistons.

Pistons can be purchased from the Buick Motor Car Co.

4.—This will not do at all and cannot be done. The piston must be given a certain amount of clearance.

If no clearance is provided the pistons will stick when the engine heats up. So far as quietness of operation is concerned you will find that it is not the pistons and rings that cause the noise but rather the valves and valve tappets. If there is end play in the pump shaft you find a distinct knock when the engine is idling. This can be overcome to some extent by repacking the pump and drawing the nuts holding the packing up rather tight.

OIL PUMPING

Q—An Oakland, model 34-B is equipped with aluminum pistons. This machine has been driven about 9000 miles. It takes a half gallon of lubrication oil every 100 miles and causes considerable spark plug trouble. Would this engine be strong enough for iron pistons and connecting rods? If oversize aluminum pistons were put in this engine at this time would it be necessary to rebore the cylinders or could they be lapped in?—A. N. Becker, Chenoa, Ill.

It is evident from the amount of oil consumed that the pistons are pumping oil in excess. It is also possible that some oil is leaking as a result of loose bearings. Iron pistons can be fitted if

you so desire and we advise purchasing the lightest iron pistons possible.

It may be that the oil pumping can be stopped by simply lapping in new pistons and rings, but if the cylinder walls have worn out of round, it will be necessary to regrind or rebore. We believe it would be advisable to regrind or rebore as it will permit doing a better job and it will stand up longer than if simply a lapping job is done.

KRIT OILING SYSTEM

Q—The oiling system on a 1914 Krit is not working properly. The plunger pump on the camshaft seems to pump oil to the transmission. Instead of dips in the bottom of the crankcase, there are two holes in the middle of the case which go into the reservoir. The oil seems to run from the flywheel case through a connecting oil lead to the reservoir. Publish a diagram and explain the oiling system of the motor.—E. C. Burt, Chicago.

The oil is placed in the motor through the breather pipe at the front of the motor or in the breather pipe in the transmission case. When the oil has been entirely drawn from the crankcase and the reservoir it will require about five quarts of oil to bring the level to its proper height, determined by the drain cock as described later.

The lubricant of all the internal parts of the engine is obtained by the connecting rods dipping $\frac{1}{8}$ -in. into the oil and splashing it into the cylinders, camshaft and crankshaft bearings.

The oil circulates from the oil reservoir and crank case of motor through the flywheel carrying up a quantity of oil and dropping it into the small cup, A, Fig. 12, which is fastened to a pipe which leads into the bottom of the crank case. The oil accumulates in the crank case until it has reached a fixed level determined by the stand pipes B and it flows back into the reservoir by means of the return

pipe C and accumulates again in the flywheel housing.

On the side of the crank case is located an oil pump which is operated by the camshaft. The oil is pumped from the lower part of the crank case or oil reservoir at a point determined to be the low level, through the sight feed on the dash and from the sight feed by gravity to the crank case. The object of the pump and sight feed system is to constantly keep before the driver of the car the knowledge that the oil level in the motor is of sufficient height for proper lubrication of the motor. On the left hand side of the reservoir are located two small drain cocks, the upper one is set to determine a high level, the lower to determine the low level.

BUICK VALVE ARRANGEMENT

Q—What is the maximum speed of a 1921 5-passenger Buick, Nash and 5-passenger Essex, all stock cars, on good roads?

2—Why do the zig-zag valves on a Buick give it more power?—Harold A. Hoak, Sterling, Ill.

1—The Essex is the only car that has been tested for speed and officially recorded. The trial was conducted under A. A. A. rules and the car attained a speed of better than 70 miles per hour. Under average conditions with an average driver it is probable that the car will not make as fast time. The other cars will attain a speed of about 60 miles per hour.

2—We cannot make any positive statements concerning the valve arrangement because it is a question of design which has been approved by the Buick engineers.

ACKNOWLEDGEMENT

Due to an oversight the illustrations on page 41, Figs. 11 and 13 of the Oct. 14 issue, were printed without acknowledgment as to their source. We wish to give credit to Frederick J. Drake & Co., for the illustrations and contents adapted from this company's book on Automobile Ignition.

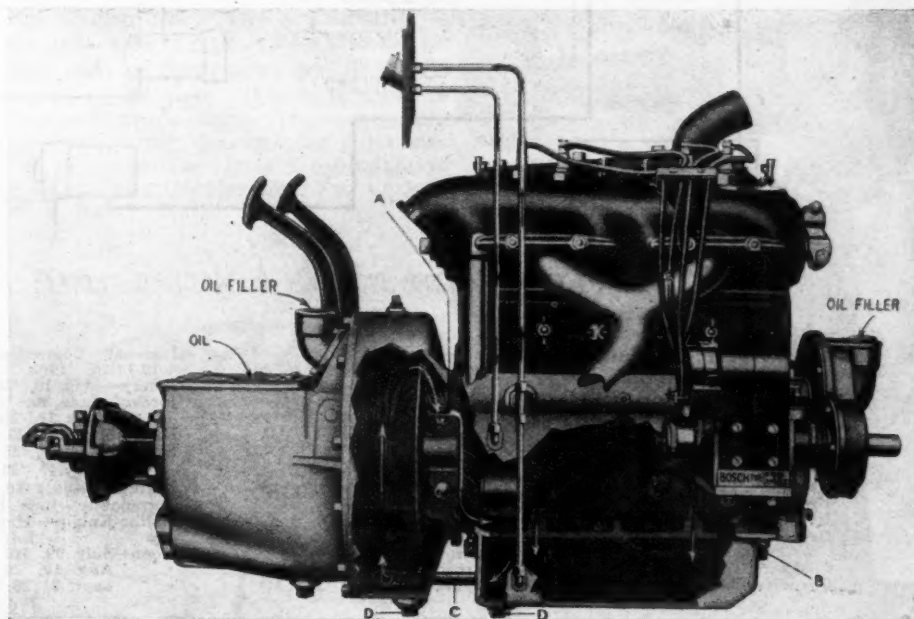
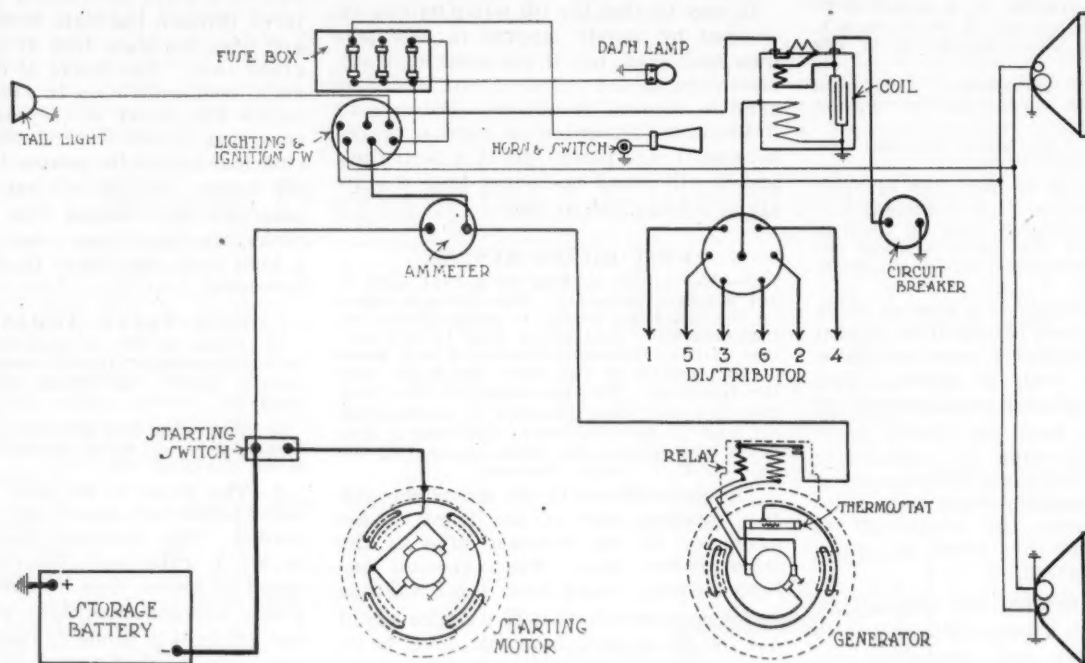
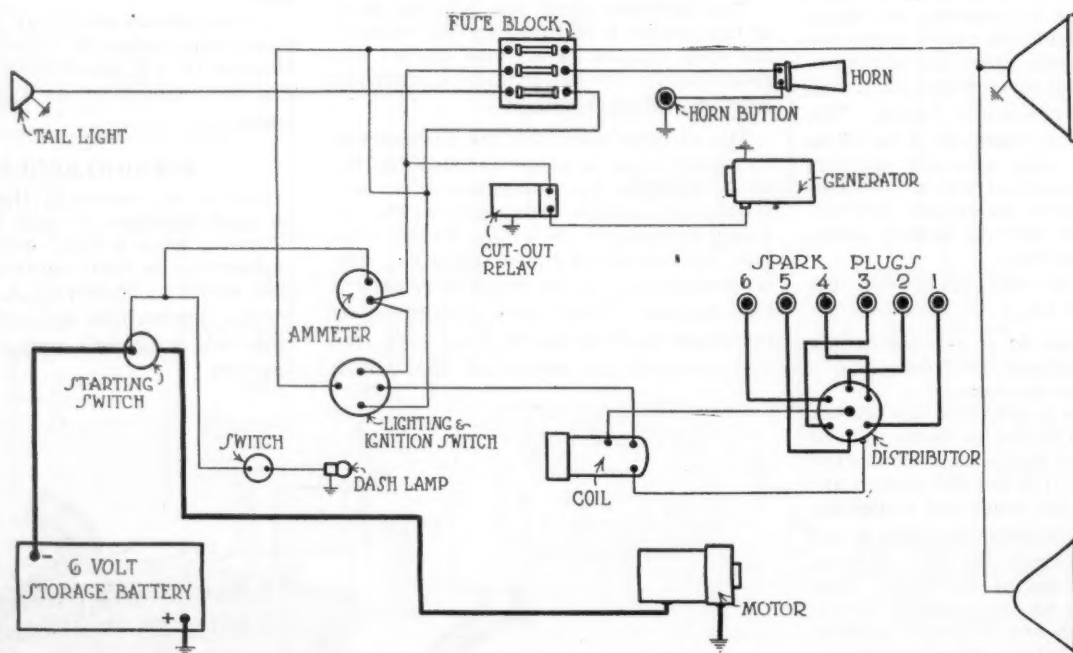


Fig. 12—Sectional view of 1914 Krit engine, showing lubricating system

Motor Age Weekly Wiring Chart No. 100



1918 KISSEL 100 PT 6



1917 SAXON S-4, 1918 SAXON Y-18, WAGNER SYSTEM

Name of car and date on which wiring diagrams appeared in previous issues

Allen—June 17, '20
Sept. 30, '20
Apperson—Aug. 5, '20
Auburn—Sept. 9, '20
Briscoe—May 6, '20
Buick—July 15, '20
Case—Aug. 5, '20
Oct. 7, '20
Chalmers—June 17, '20
Chandler—May 20, '20

Cole—June 10, '20
Crow-Elkhart—July 29, '20
Davis—Aug. 12, '20
Sept. 2, '20
Dort—Aug. 12, '20
Elcar—May 6, '20
Elgin—Oct. 14, '20
Franklin—June 3, '20
General Battery Charging—
Sept. 15, '19
General Magneto Diagram—
June 15, '19
Grant—Aug. 12, '20
Harroun—July 15, '20
Haynes—June 24, '20

Internal Connections—July
10-17-24, '19
Jeffery—May 13, '20
Jordan—June 10, '20
July 22, '20
King—May 20, '20
Kissel—May 27, '20
Aug. 19, '20
Lexington—July 20, '20
Locomobile—June 10, '20
Moline-Knight—May 20, '20
July 22, '20
Moon—July 29, '20
Aug. 19, '20
Sept. 2, '20

Oldsmobile—Sept. 16, '20
Packard—Oct. 7, '20
Peerless—May 13, '20
Pierce-Arrow—July 15, '20
Reo—July 22, '20
Roamer—Aug. 5, '20
Sept. 30, '20
Saxon—Sept. 9, '20
Scripps-Booth—Aug. 26, '20
Stephens—Sept. 16, '20
Studebaker—July 1, '20
Stutz—July 8, '20
Special Systems for Fords—
May 15-22, '19
Willys-Knight—Oct. 14, '20

Service Equipment Time Savers for the Shop

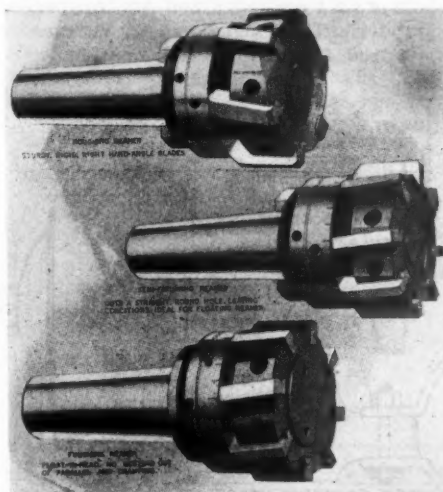
Ideco Visible Service Station

By the use of a vacuum system in the Ideco visible service station the gasoline is drawn from an underground storage tank up into the two visible glass bottles. These containers each hold 5 gal., are placed in an inverted position and controlled by patented valves which function for the vacuum and gas by the movement of the handles at the dials marked "FILL", "HOLD" or "HOSE" position. When the handles are moved to drain position, the door when closed locks the handles in this position, draining the contents of the bottles back into the underground tank.

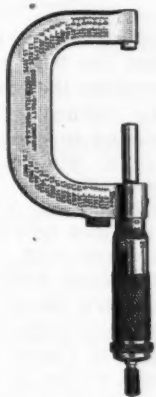
Either bottle may be filled or emptied through the hose into a car independent of the other, but a continuous filling and emptying process is provided. The illustration shows the position of handles for draining the right-hand bottle into hose while the left-hand bottle is filling. The tank or body is merely a vacuum storage tank with a gauge showing the pounds of vacuum on storage and the motor driven vacuum pump furnished with the system is only started when the storage of vacuum needs building up. These tanks are manufactured by Ideco, Inc., Springfield, Ill.

Wetmore Cylinder Ream- ing Sets

These sets consist of the roughing reamer, semi-finishing reamer and the finishing reamer. The roughing reamer for the initial operation is designed with the blades set at a right hand angle. The entire reamer is of special heat treated alloy steel and the arbors are surface hardened and ground. The semi-finishing reamer has left hand angle cutting



Wetmore cylinder reaming sets



Micrometer



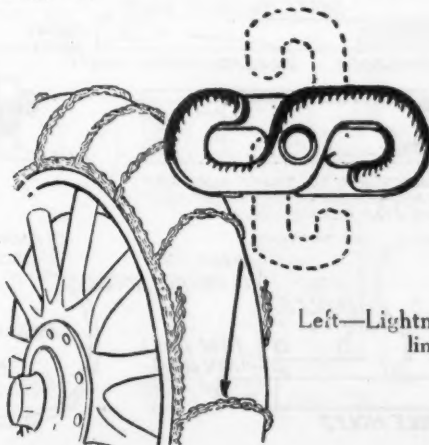
Ideco Service Station

blades and is claimed to make adjustments of .001 in. by means of a graduated micrometer lock nut at rear of the blades.

The finishing reamer is of the float-in-head design with blades set at left hand angle and staggered. The float is an Oldham with rollers said to do away with friction. The float mechanism is protected from dust by a cap covering the front and a washer protecting the back. Manufactured by the Wetmore Reamer Co., Milwaukee, Wis.

Lightning Coupler Link

No tools are required, it is claimed, to repair a side chain or a cross chain with this coupler link. The smaller link is the same size as cross chains and fits all sizes used on pneumatic tires. It is said not to injure tires. It also is made in sizes to fit truck chains. The smaller size sells for \$1 per doz. and the truck size for \$2 per dozen. It is the product of the Lightning Coupler Link Co., Sharpsburg, Pa.



Left—Lightning coupler link

Van Dorn Electric Grinders

These 1 hp. electric floor grinders, designed for all kinds of light grinding in shop and service stations, are built in bench or pedestal style, with grinding wheel and buffer. They are furnished complete with two wheels, 10 by 1½ in., line switch and fuses ready to connect to power circuit. Ball bearings are fitted throughout, provision is made for ample lubrication, and an equalizing coupling between motor and extension shaft insures smooth running. The speed is 2000 r. p. m. for the direct current type and 1800 r. p. m. for alternating current. To meet the Underwriters' requirements the direct current type is fitted with automatic starter inside of the pedestal. Made by Van Dorn & Dutton Co., Cleveland, O.

Two-Inch Micrometer

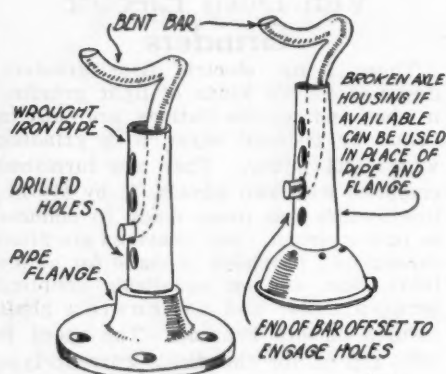
The Goodell-Pratt Co., Greenfield, Mass., have recently put on the market a graduated micrometer which can be read in 1-1000 of an inch up to two inches. Decimal equivalents are etched on the frame which is drop-forged from a solid steel bar. This micrometer is provided with a locking device to hold the screw in any desired position and also has a ratchet mechanism on the thimble in a position easily accessible. The end of the thimble is provided with a speeder by means of which the screw can be rapidly run back and forth. The price is \$12 without the leather case, which sells for \$1.80.



Right—Van Dorn electric grinder

The Automotive Repair Shop

Practical Maintenance Hints



Adjustable Stand for the Garage

Adjustable stands for use in the garage can be made up in a simple manner by following the suggestion in the sketch.

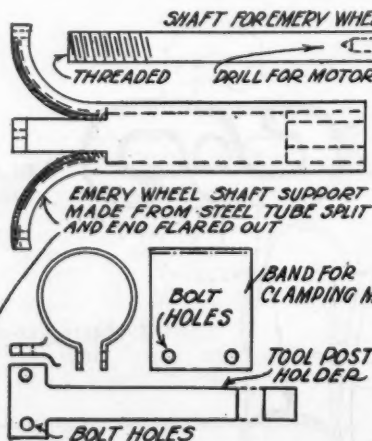
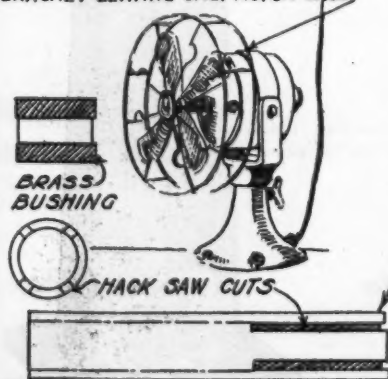
This consists of a pipe flange, piece of 2 or 3 in. wrought iron pipe and a bent bar.

A number of holes giving a range of adjustment are drilled through the side of the pipe. The bar is bent with a sharp offset at the lower end to engage the holes. The upper end is hooked shaped to facilitate placing it under axles, frame or parts where the screw type of jack will not readily reach. Several of these stands can be advantageously used in overhaul work.

Scraping Carbon From Piston and Cylinder Heads

A 5 in. section of hack saw blade, bent piece of steel rod and the steel shell from a spark plug can be assembled into a scraper that is serviceable for the removal of carbon from the head of the pistons and top of the cylinders of a gas engine, the details of which are shown in the sketch.

REMOVE GUARD FAN SWIVEL AND BRACKET LEAVING ONLY MOTOR CASE

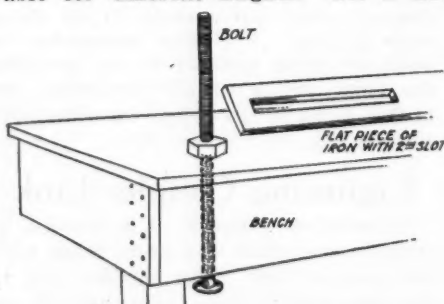


The steel rod is slotted to receive the end of the saw blade and the bent end serves as a handle for scraping the blade across the surfaces to be cleaned. The sides of the blade are ground to remove the teeth and give a flat edge. The spark plug shell and gland holds the tool in a vertical position when screwed into the cylinder. To enter the tool into the cylinder the piston is lowered with the starting crank if the clearance around the spark plug aperture is not enough.

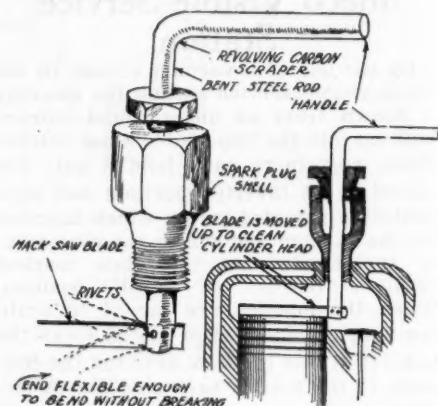
The flexibility of the blade is sufficient to allow the scraper edge to reach all of the surface. The length of the blade is determined with the aid of a bent wire. Make the blade perpendicular to the stem and rivet in place solidly. In the event the blade is too brittle the temper can be drawn to a straw color by drawing it across a heated piece of iron.

Removing Valve Springs

A simple device for removing springs on either cage or removable head valves is shown in sketch. Drill a hole in the bench and place a long bolt with plenty of threads in this hole so as to be adjustable for different heights. Get a flat



piece of iron 1 in. wide or wider, and about 2 ft. long and cut a 2 in. slot in it. Set over top of spring, press down and remove pin, and vice versa for putting the valves back.—A. D. Stuehrn, Square Deal Garage, Peotone, Ill.



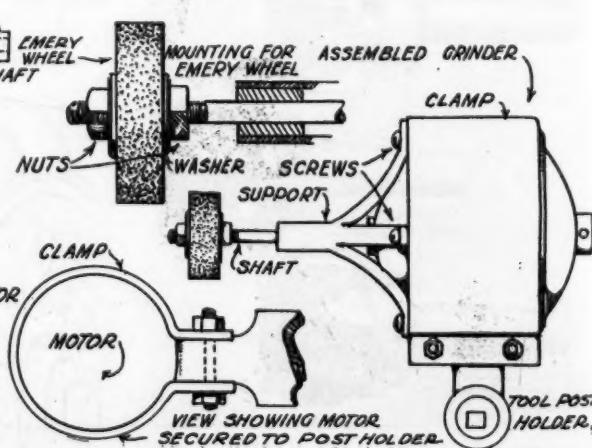
Small Tool Post Grinder for Repair Shop

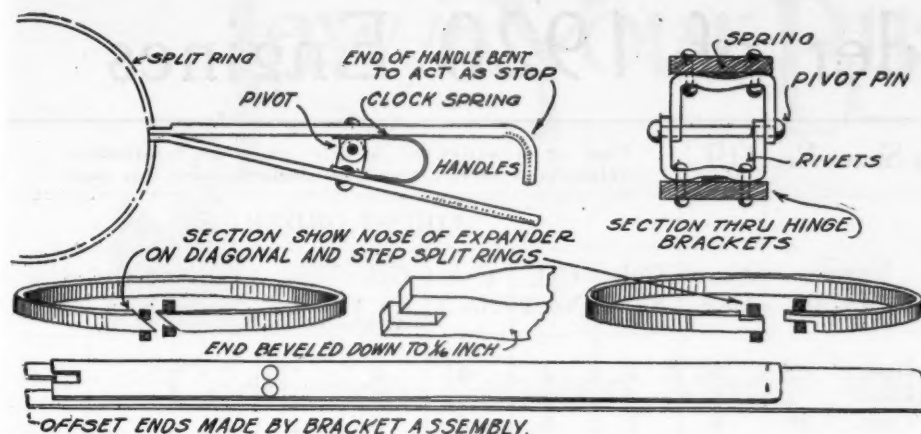
An electric motor from an office fan can be converted into a tool post grinder suitable for a lathe in the repair shop by the addition of a bracket for securing in the tool post and an emery wheel shaft with a support extending forward from the motor casing.

The appended parts of the fan are removed leaving only the motor and the surrounding shell. A circular brass sleeve is fitted as shown and bolted to a rectangular piece of steel to go through the tool post.

The emery wheel shaft is of round steel drilled to fit over the armature shaft and pinned into place. The support for the emery wheel shaft is a piece of steel or wrought iron tubing slotted and bent to bolt to the screws on the motor housing. The end of this extension is provided with a brass bushing for the shaft.

For grinding valves, wrist pins, cams, bearings, or for tool sharpening, etc., this is a convenient and an inexpensive grinder. The usual shop current is required for turning the motor.





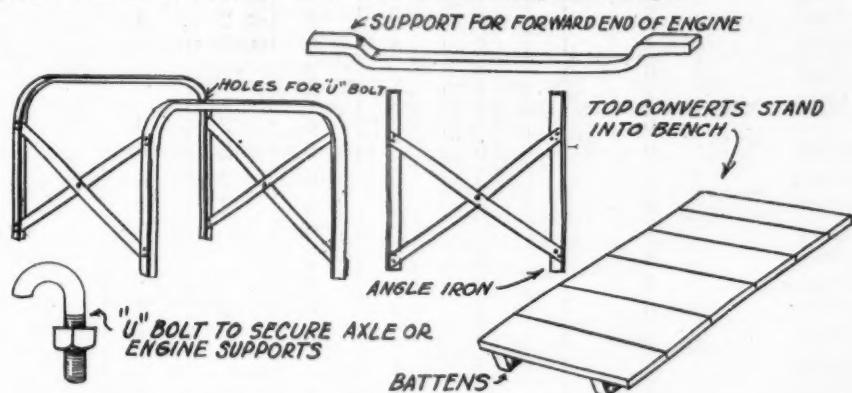
Tool for Expanding Split Rings

A tool that will expand either the diagonal split or step split ring is shown in the sketch. This consists of two parts of flat strip steel with a groove in the end of each. These are pivoted on two riveted supports joined at the center with a dowel pin.

A piece of spring steel as an alarm clock spring holds the handles apart. The grooved ends are beveled down to

about 1/16 in. in thickness so these may be readily inserted between the ends of the ring. The removal of a ring or the placing of a ring can be done rapidly with this tool, without the difficulties attending the use of pieces of tin at places under the ring as is common practice.

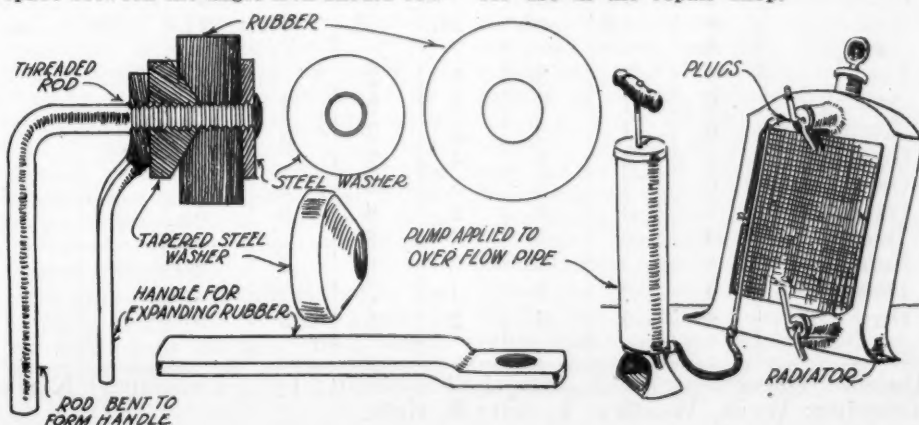
To avoid expanding a ring too far one handle can be bent in to bear against the other acting as a stop.



Axle and Engine Stand for the Repair Shop

A simple stand that is rugged and easily constructed is shown in the sketch. This stand is suitable for engine and rear axle members that are undergoing repair or overhaul. Two sections of angle iron with cross braces bent and riveted as shown makes a stand that affords more access to the parts under repair than a wooden stand which must necessarily be made and braced more heavily. The space between the angle iron should con-

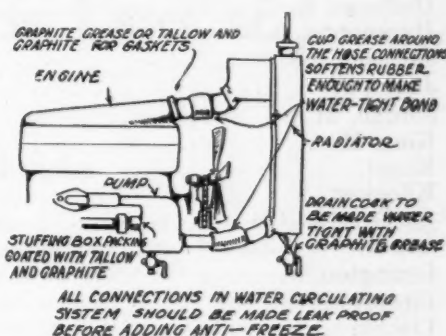
form to the engine supports which the shop makes a specialty of. A cross arm should be arranged as a separate part to support the forward end of the engine or the drive shaft end of the axle assembly. Two "U" bolts for holding the axle solidly to the frame are also used with the stand. A wooden top with batten converts this stand into a bench, making this stand a feature of many purposes for use in the repair shop.



Preparing the Radiator for Anti-Freeze

In winter when the radiator is filled with costly anti-freeze, leaks should not be tolerated.

For the hose at the junction to the radiator and motor the simplest material to apply is cup grease. This softens the rubber just enough to cause it to close in around the metal pipes from the radiator, pump and motor when the clamps are applied. Shellac is not of much value



on the hose and gaskets, inasmuch as the alcohol, if used, will dissolve this.

The best material for the gaskets is graphite grease, which should be applied liberally to each side of the gasket and the bolts pulled up tight. Likewise in the pump stuffing box or gland, the packing should be saturated in graphite grease before inserting. Another grease for use on stuffing box packing and gaskets about the water pipes is made by melting tallow candles in a pan and stirring into this a few tablespoonfuls of powdered graphite.

Glands, packings and even rubber hose with this applied at the connection will hold against leakage indefinitely. For drain cocks this tallow and graphite should be applied after the valve cock is removed. The thread of the drain cock will also be made leak proof by an application of this composition.

Plug for Closing Radiators Under Repair

When repairing radiators a quick method of closing the inlet and outlet pipes of the radiator is by means of the expanding plug shown in the sketch. Several sizes of these plugs for the various types of radiators should be made. With the inlet and outlet closed the radiator is filled with air by simply slipping the rubber tube from a tire pump over the end of the overflow pipe.

The details of the expanding plug shown are as follows: A piece of round steel is threaded for a distance of about 3 in. A piece of flat steel is tapped out at one end to fit over the threaded rod. A tapered washer is a sliding fit over the threaded rod. A section of thick rubber circular in shape is cut smaller than the opening to be closed. A circular washer threaded and screwed on the end of the rod is riveted to make it secure. Bending the rod end provides a handle for holding while the other handle is turned, compressing the rubber.

Firing Order of 1920 Engines

Motor Age Maintenance Data Sheet No. 119

One of a series of weekly pages of information
valuable to service men and dealers—save this page

Name and Model	Engine Make	No. of Cyls.	FIRING ORDER							
			Cyl. No. 1	Cyl. No. 2	Cyl. No. 3	Cyl. No. 4	Cyl. No. 5	Cyl. No. 6	Cyl. No. 7	Cyl. No. 8
(Continued from last week)										
Huffman, R.	Own	4	1	2	4	3				
Hupmobile, R.	Own	4	1	2	4	3				
Jackson, 6-38.	Cont., 7 R	6	1	5	3	6	2	4		
Jones, 28.	Cont.	6	1	5	3	6	2	4		
Jordan, M.	Cont.	6	1	5	3	6	2	4		
King, H.	Own	8	1R	4L	3R	2L	4R	1L	2R	3L
Kissel.	Own	6	1	4	2	6	3	5		
Klinekar.	Cont.	6	1	5	3	6	2	4		
La Fayette, 134.	Own	8	1L	2R	3L	1R	4L	3R	2L	4R
Leach.	Cont.	6	1	5	3	6	2	4		
Lexington, S.	Cont.	6	1	5	3	6	2	4		
Liberty, 10-C.	Own	6	1	4	2	3	6	5		
Lincoln.	Own	8								
Locomobile, 48.	Own	6	1	5	3	6	2	4		
Lorraine, 20-T.	H-S	4	1	3	4	2				
Maibohm.	Falls	6	1	4	2	6	3	5		
Marmon, 34-B.	Own	6	1	5	3	6	2	4		
Maxwell, 25.	Own	4	1	3	4	2				
McFarlan, 147.	Own	6	1	5	3	6	2	4		
Mercer, S-5.	Own	4	1	3	4	2				
Metz, Master 6.		6	1	5	3	6	2	4		
Mitchell, F-40.	Own	6	1	5	3	6	2	4		
Monitor.	Cont.	6	1	5	3	6	2	4		
Moon, 6-48-20.	Cont.	6	1	5	3	6	2	4		
Moore.	Own	4								
Monroe.	Own	4	1	3	4	2				
Meteor.	Duesen.	4	1	3	4	2				
Nash, 681-2-4-5-6-7.	Own	6	1	5	3	6	2	4		
National, Sextet BB.	Own	6	1	5	3	6	2	4		
Nelson.	Own	4	1	2	4	3				
Noma.	Cont.	6	1	5	3	6	2	4		
Norwalk.	Lyc.	4								
Oakland, 34-C.	Own	6	1	5	3	6	2	4		
Ogren, 6-60.	Own	6	1	4	2	6	3	5		
Oldsmobile, 37-A.	North.	6	1	5	3	6	2	4		
Oldsmobile, 45-B.	Own	8	1L	4R	2L	3R	3L	2R	4L	1R
Olympian, 45.	Own	4	1	3	4	2				
Overland, 4.	Own	4	1	3	4	2				
Owen Magnetic, 60.	Own	6								
Packard, Twin Six.	Own	12		1R 6R	6L 1L	4R 3R	3L 4L	2R 5R	5L 2L	
Packard, Single Six.	Own	6	1	5	3	6	2	4		
Paige, 6-42.	Own	6	1	5	3	6	2	4		
Paterson, 6-50.	Cont.	6	1	5	3	6	2	4		
Peerless, 56-Series 6.	Own	8	1R	4L	3R	2L	4R	1L	2R	3L
Phianna.	Own	4								
Piedmont, 4-30.	Lyc.	4	1	3	4	2				
Pierce-Arrow, 38 & 48.	Own	6	1	5	3	6	2	4		
Pilot, 6-45.	Teetor	6	1	5	3	2	6	4		
Porter, 46.	Own	4	1	3	4	2				
Premier, 6-D.	Own	6	1	5	3	6	2	4		
Reo, T-6.	Own	6	1	4	2	6	3	5		
Re Vere, C.	Duesen.	4	1	3	4	2				
Roamer.	Cont.	6	1	5	3	6	2	4		
Roamer.	Duesen.	4	1	3	4	2				
R. & V. Knight, J.	Own	6	1	4	2	6	3	5		
(Concluded next week)										

Abbreviations—Cont., Continental; Duësen., Duesenberg; H-S, Herschell-Spillman; Lyc., Lycoming; North, Northway; Ruten., Rutenber; Weid., Weidley; L, left; R, right.

Law in Your Business

By Wellington Gustin



Confliction Between Motor Vehicle Laws of Kansas and Nebraska

License Receipts Not Recognized in Nebraska

A REPRESENTATIVE instance of the confliction resulting from the lack of uniform automobile laws throughout the states has been brought to our attention by an automobile dealer in Kansas. This case, although involving but a small sum, and for that reason the more apt never to reach the higher courts for a decision, should receive the attention of the national associations upon whom rests the burden of securing uniform automobile laws.

MR. H. R. KUGLER, the dealer in Kansas, sold a 1920 Buick car to Mr. Miller of Junction City, Kan., who applied for a license and received the regular receipt. The car sold Mr. Miller was in Michigan at the time and was to be driven out. The law of Kansas allows a man to drive his car until the license tag is received, the regular receipt being considered all that is necessary for fifteen days. Mr. Miller started for Michigan after his car before receiving the license tag, but took with him his receipt. In driving his car from the factory everything went all right until he reached Havelock, Neb.

At that point a zealous policeman arrested him and had him fined \$5.70 for not having a metal tag on his car, and would not take into consideration the fact that he had with him the regulation receipt. This matter was reported by Mr. Miller to H. R. Kugler, the dealer from whom he purchased his Buick. Mr. Kugler accordingly wrote the Secretary of State, Lincoln, Neb., requesting a refund of the fine paid by Mr. Miller while driving through Nebraska, being particularly anxious to understand the Nebraska law for the reason that he had several other cars to be driven from the factory which would have to pass through Nebraska.

The reply was to the effect that no one would be permitted to drive a car in Nebraska unless equipped with a license plate, the receipt not being considered sufficient.

SEEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. MOTOR AGE presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer, but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty problems as may be submitted to him.

The injustice of the Nebraska law is apparent when we reflect that a citizen of another state, having fully complied with the motor laws of his own state, which give him the right to operate his car a specified time while waiting for his license plates, may not drive his car into Nebraska without being subject to arrest and fine.

A narrow construction of the Nebraska statute would prevent non-residents from driving into or through Nebraska without metal plates, resulting in wrongs and injustice done the non-residents by zealous officials. The case Mr. Kugler cites is an actual instance. Happily a sense of justice ordinarily prevents officers and citizens from enforcing the letter of the law that carries injustice. Under the ruling made in Kugler's case, there was nothing to prevent his buyer being arrested in every precinct and county in Nebraska through which he passed, except the feeling of injustice in making the arrest and imposing a fine.

We cannot believe that the Nebraska legislature intended to force non-residents to take out a Nebraska license, under the circumstances cited by Mr. Kugler, nor to force them to stay out of the state until they had received their license plates. But since the officials are so ruling, a test case should be carried

to the Supreme Court to get its ruling on the question. Perhaps the best procedure would be to secure a revision or amendment of the Nebraska law at the hands of the legislature. The right of a dealer or another to drive through a state in bringing cars from the factory will be discussed in a later article.

The injustice of the Nebraska ruling no doubt would be readily corrected if properly presented to the state legislature. The associations in Nebraska should be urged to take up the matter.

In looking up the motor vehicle law in Kansas, it was found that the last legislature of that state covered the points involved here, and wisely if not generously, exempted a non-resident owner from complying with the requirements as to display of license plate, accepting the owner's compliance with his own state law as to registration and license plate display as sufficient. Since the rule is not being recognized by state officials it should be put into a statute. This article is intended to secure justice for those who may be forced to pay fines for violation of laws they know not of.

This is a matter in which not only the dealers and others driving in or through Nebraska and other states having similar laws are interested, but every automobile owner as well as dealer in the United States should be interested to see it properly corrected. It is the result of the lack of uniform automobile laws in all the states. Other similar conflicts will arise until uniformity of the laws in that respect is attained. If the states would give up their jealously guarded rights to the extent of permitting the federal government at Washington to enact a national uniform motor vehicle law all conflict be avoided.

This is a big job, but not an impossible one. The various national automobile associations and those connected with the automotive industry are best placed in a position to take up such a work and carry it out. It would not prevent one state having more or less number of provisions as suited to its particular requirements, but it would prevent a conflict and resulting injustice and possible demoralization of the industry.

Specifications of the Electrical Equipment Found on 1920 Passenger Cars

Make and Model	IGNITION			GENERATOR		MOTOR		BATTERY			Wiring System	Units Combined	FUSES		
	Sys-tem	Make	Control	Make	Volt-age	Make	Volt-age	Make	Amp. Hr.	Volt-age			Type	Volts	Amp.
Allen.....43	Single	Conn.	Hand.	West.	6	West.	6	U. S. L.	90	6	1	GI.	GT.	6	15
American.....C	Single	Conn.	Hand.	G & D.	6	G & D.	6	Willard.	110	6	1	S.	3-A.	1.250	20
Anderson.....All	Single	Remy.	Hand.	Remy.	6	Remy.	6	Willard.	90	6	1	S.			
Apperson.....All	Single	Remy.	Hand.	Bijur.	6	Bijur.	6-8	Willard.	90	6	1	S.	Open.	1.250	10
Auburn.....6-39	Single	Remy.	Hand.	Remy.	6	Remy.	6	Willard.	90	6	1	S.		6-8	25
Beggs.....20-T		Conn.	Hand.	A-L.	6	A-L.	6	Exide.	90	6	1	GT.	Cart.	6	15
Bour-Davis.....21	Single	West.	Hand.	West.	6	West.	6	Willard.	111	6	1	S.	GT.	6	15
Brewster.....Single		Berling.	Hand.	U. S. L.	12	U. S. L.	12	U. S. L.			1				
Briscoe.....4-34	Single	Conn.	Hand.	A-L.	6	A-L.	6	Prest-O-L.	80	6	1	GI.	GT.	6	20
Buick.....Single		Delco.	Hand.	Delco.	6	Delco.	6	Willard.	132	6	1	S.			
Cadillac.....59	Single	Delco.	H. & A.	Delco.	6	Delco.	6	Exide.	130	6	1	GM.			
Case.....V-20	Single	Delco.	H. & A.	West.	6	West.	6	Willard.	111	6	1	GI.	5AGT.	50	
Chalmers.....35-C	Single		Hand.		6		3		106	6	1	GI.	GT.	6	15-30
Champion.....KO	Single	Delco.	Hand.	Dyneto.	6	Dyneto.	6	Willard.	90	6	1	S.	GT.	6	200
Chandler.....All	Single	Bosch.	Hand.	G & D.	6	G & D.	6	Prest-O-L.	105	6	1	S.	GT.	6	
Chevrolet.....All	Single	Remy.	Hand.	A-L.	6	A-L.	6	Willard.	111	6	1	GI.	GT.	6	
Cleveland.....40	Single	G & D.	Hand.	G & D.	6	G & D.	6	Prest-O-L.	94	6	1	S.	GT.	6	20
Cole.....All	Single	Delco.	H & A.	Delco.	6	Delco.	6	Prest-O-L.		6	1	S.			
Columbia.....All	Single	At-Kent.	Hand.	A-L.	6	A-L.	6	Prest-O-L.	80	6	1	S.			
Comet.....C-53	Single	Wagner.	Hand.	Wagner.	6	Wagner.	6	Willard.	111	6	1				
Commonwealth.....42	Single	At-Kent.	Hand.	Dyneto.	6	Dyneto.	6	Prest-O-L.	105	6	1		GT.		
Crow-Elkhart.....L-55	Single	Conn.	Hand.	Dyneto.	6	Dyneto.	6	Exide.	120	6	1		Cart.	6	10
Cunningham.....V-4	Single	Delco.	H & A.	Delco.	6	Delco.	6	Willard.	132	6	1				
Daniels.....8-D	Single	Delco.	H & A.	Delco.	6	Delco.	6	Willard.	132	6	1	S.			
Davis.....51	Single	Delco.	Hand.	Delco.	6	Delco.	6	Willard.	90	6	1	S.			
Dixie Flyer.....Single		Eisemann.	Hand.	Dyneto.	6	Dyneto.	6	Willard.	90		2				
Dodge Brothers.....Single		Own.	H & A.	N. E.	12	North East	12	Willard.	49	12	1	GM.	Encl.	1-50	10
Dorris.....6-80	Single	Bosch.	Hand.	West.	6	West.	6	Willard.	102	6	1	S.	GT.	5-8	15
Dort.....15	Single	Conn.	Hand.	West.	6	West.	6	U. S. L.	85	6	1	S.		6	10
du Pont.....A	Single	Eisemann.	H & A.	West.	6	West.	6	Exide.	115	6	1	S.			
Economy.....6-46	Single	Own.	Hand.	A-L.	6	A-L.	6	Willard.	84	6					
Elcar.....All	Single	Delco.	Hand.	Delco.	6	Delco.	6	Willard.	90	6	1	S.	GT.	6-8	20
Elgin.....K	Single	Wagner.	Hand.	Wagner.	6	Wagner.	6	Willard.	90	6	1		GT.	6-8	20
Essex.....A	Single	Delco.	H & A.	Delco.	7	Delco.	6	Exide.	105	6	1	S.			
Ferris.....Single		Splitdorf.	Hand.	L-N.	6	L-N.	6	Willard.	132	6	1	S.		6-8	
Ford.....T	Single	Own.	Hand.	Own.	6	Own.	6		80	6	1	S.			
Franklin.....9-B	Single	At-Kent.	Auto.	Dyneto.	12	Dyneto.		Willard.	67	12	2	GM.	GT.	14	10
Gardner.....O	Single	West.	Hand.	West.	6	West.	6	Willard.	90	6	1	S.	GT.	6	20
Geronimo.....Single		Delco.	Hand.	Dyneto.	6	Dyneto.	6	Exide.	90	6	1	S.	none	6	
Grant.....H	Single	At-Kent.	Hand.	Bijur.	6	Bijur.	6	Prest-O-L.	90	6	1	S.	2GT.	6-8	15
Handley-Knight.....Single		Conn.	Hand.	A-L.	6	A-L.	6	U. S. L.	162.6	6	1	S.	GT.	6-8	20
Hanson.....54-A	Single	Delco.	Hand.	Delco.	6	Delco.	6	Prest-O-L.	100	6	2				
Harroun.....Single		Remy.	Hand.	Remy.	6	Remy.	6	Prest-O-L.	80	6	1				
Harvard.....All	Single	Bosch.	Hand.	Dyneto.	6	Dyneto.	6	Prest-O-L.	120	6	1	S.			
Hatfield.....A		Conn.	Hand.	Dyneto.	6	Dyneto.	6	Willard.	111	6	1	GI.			
Haynes.....47	Single	Kingston.	Hand.	Lecce-N.	6	Lecce-N.	6	Willard.	132	6	1	GI.	GT.	6	5
H. C. S. Special.....Single		Delco.	Hand.	Delco.		Delco.		Willard.	111						
Hollier.....206-B	Single	West.	Hand.	West.	6	West.	6	U. S. L.	80	6	1	S.	GT.	6	20
Holmes.....Single		Eisemann.	Auto.	Dyneto.	12			Willard.	69	12	2	S.	GT.	15	15
Hudson Super-Six.....Single		Delco.	H & A.	Delco.	7	Delco.	7	Exide.	105	6	1	GM.			
Huffman.....Single		Conn.	Hand.	Dyneto.	6	Dyneto.	6	Willard.	90	6	1	S.		6	25
Hupmobile.....R	Single	At-Kent.	Hand.	West.	6	West.	6	Willard.	90	6	1	S.	Encl.	6	10
Jackson.....6-38	Single	Remy.	Hand.	A-L.	6	A-L.	6	U. S. L.	94	6	1	GI.	GT.	6-8	15
Jones.....All	Single	Remy.	Hand.	A-L.	6	A-L.	6	Prest-O-L.	120	6	1	GI.	GT.	6	20
Jordan.....F	Single	Delco.	Hand.	Delco.	6	Delco.	6	Willard.	90	6	1	S.	C. B.		
Jordan.....M	Single	Delco.	Hand.	Delco.	6	Delco.	6	Willard.	90	6	1	S.	C. B.		
Kenworthy.....4-80	Single	Bosch.	Hand.	Bijur.	6	Bijur.	6	Exide.	140	6	1	S.		6	10
Kenworthy.....6-55	Single	Bosch.	Hand.	West.	6	West.	6	Exide.	140	6	1	S.		6	10
King.....8	Single	At-Kent.	Hand.	West.	6	West.	6	Prest-O-L.	120	6	1	S.	Cart.	6	10
Kissel.....All	Single	Willard.	Hand.	Remy.	6	Remy.	6	Willard.	111	6	1	S.	3 A. G.	6	20
Kline.....6-55-J	Single	Conn.	Hand.	Wagner.	6	Wagner.	6	Prest-O-L.	80	6	1	S.	5 A. G.	6	
LaFayette.....Single		Delco.	H & A.	Delco.	6	Delco.	6	Exide.	130	6	1	GM.	C. B.		
Leach.....Double		Delco.	Hand.	Delco.	6	Delco.	6	Prest-O-L.	180	6	1	S.	Cart.	6	15
Lexington.....S-20	Single	Conn.	Hand.	G & D.	6	G & D.	6	Willard.	111	6	1		GT.	6	15-5
Liberty.....10-C	Single	Wagner.	Hand.	Wagner.	6	Wagner.	6	Prest-O-L.	90	6	1	GI.			
Locomobile.....48-6-7	Dual	Berling.	Hand.	West.	6	West.	6	Exide.	150	6	1	S.	G. T.	6	10
Lorraine.....Single		West.	Hand.	West.	6	West.	6	U. S. L.	94	6	1	S.	GT.		

ABBREVIATIONS: *Starting and Lighting in closed models only. Ignition: At-K, Atwater-Kent; Conn., Connecticut; West, Westinghouse; Auto, Automatic; H & A, Hand and Automatic; S. A., Semi-Automatic. Generator: A-L, Auto-Lite; G & D, Gray & Davis; Lecce-N, Lecce-Neville; Ward-L, Ward-Leonard; N. E., North East; Split, Splitdorf. Motor: A-L, Auto-Lite; G & D, Gray & Davis; Lecce-N, Lecce-Neville; West, Westinghouse.

Giving Ignition, Starting, Lighting, Battery, Lamp, Spark Plug and Horn Data

LAMP CANDLEPOWER, VOLTAGE AND TYPE OF BASE									SPARK PLUGS			Horn	Make and Model
Base Contact	HEADLIGHTS		SIDELIGHTS		TAILLIGHTS		DASHLIGHT		Make	Diam. Inches	Thread Pitch		
	Volts	CP.	Volts	CP.	Volts	CP.	Volts	CP.					
Single...	6-8	18	*6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Klaxon...	Allen... 43
Single...	6-8	15	*6-8	5	3-4	2	d3-4	2	Bethlehem...	7/8	18	Sparton...	American... C
Single...	6-8	17			6-8	2	6-8	2	A. C.	7/8	18	E. A. L.	Anderson... All
Single...	6-8	18	*6-8	4	d6-8	2	d6-8	2	A. C.	7/8	18	Sparton...	Apperson... All
Double...	6-8	18			6-8	2	6-8	2	Rajah...	7/8	18	E. A.	Auburn... 6-39
Single...	6-8	15	*6-8	4									
Single...	6-8	21	6-8	4	3-4	2	3-4	2	Champion...	7/8	18	Trojan...	Beggs... 20-T
Single...	6-8	21	6-8	5	6-8	2	6-8	2	A. C.	7/8	18	Trojan...	Bour-Davis... 21
Single...	6-8	36	12	4	6-8	2	d6-8	2	Herz-Boug...	7/8	18	Klaxon...	Brewster... 4-34
Single...	6-8	21			6-8	2	d6-8	2	Champion...	7/8	18	Sparton...	Briscoe... 4-34
Single...	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Stewart...	Buick...
Single...	7	18	8	6	4	2	3-4	2	Titan...	7/8	18	Delco...	Cadillac... 59
Single...	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Case... V-20
Single...	6-8	15	6-8	4	6-8	2	6-8	2		7/8	18		Chalmers... 35-C
Single...	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Garford...	Champion... KO
Single...	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Chandler... All
Single...	6-8	21	6-8	4	6-8	2	d6-8	4	A. C.	7/8	18	Klaxon...	Chevrolet... All
Single...	6-8	17	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Cleveland... 40
Single...	6-8	21	*6-8	5	6-8	4	d6-8	5	A. C.	7/8	18	Sparton...	Cole... All
Single...	6-8	15	*6-8	4	6-8	2	d6-8	2	Champion...	7/8	18	Schwarze...	Columbia... All
Single...	6-8	18			6-8	2	6-8	4	A. C.	7/8	18	Klaxon...	Comet... C-53
Single...	6-8	21	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	E. A. L.	Commonwealth... 42
Single...	6-8	15	6-8	4	6-8	2	d6-8	2	Champion...	7/8	18	E. A. Lab...	Crow-Elkhart... L-55
Single...	6-8	21	6-8	4	6-8	2	d6-8	2	Champion...	7/8	18	Sparton...	Cunningham... V-4
Single...	6-8	21	6-8	4	6-8	2	6-8	2		7/8	18		
Single...	6-8	21	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Klaxon...	Daniels... 8-D
Single...	6-8	21			6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Davis... 51
Double...	6-8	15			d3-4	2	d3-4	2	Champion...	7/8	18	Garford...	Dixie Flyer...
Single...	12-16	15			12-16	2	12-16	2	A. C.	7/8	18	NorthEast	Dodge Brothers...
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Opt.	7/8	18	Klaxon...	Dorris...
Single...	6-8	15			*6-8	2	d6-8	2	A. C.	7/8	18	Schwarze...	Dort... 15
Single...	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	du Pont... A
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion...	7/8	18		Economy... 6-46
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	E. A. L.	Elcar... All
Single...	6-8	15			3-4	2	*3-4	2	A. C.	18 m.m.	1.5 m.m.	E. A. L.	Elgin... K
Single...	6-8	21	6-8	6	6-8	2	6-8	4	Champion...	7/8	18	Sparton...	Essex... A
Sgl. & Dbl.	6-8	17	6-8	2	6-8	2	6-8	2	Champion...	1 1/2	pipe		Ferris...
Double...	12-16	15	*12-16	4	6-8	2	6-8	2	Opt.	7/8	18	Own...	Ford... T
Single...	6-8	15			6-8	2	6-8	2		7/8	18	Klaxon...	Franklin... 9-B
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Gardner... G
Single...	6-8	21			6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Geronimo...
Single...	6-8	15	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Grant... H
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Sparton...	Handley-Knight...
Single...	6-8	15			6-8	3	6-8	3	Champion...	7/8	18	Schwarze...	Hanson... 54-A
Single...	6-8	15			3-4	2	d3-4	2	A. C.	7/8	18	Schwarze...	Harroun...
Double...	6-8	21	6-8	5	6-8	2	6-8	2	Bethlehem...	7/8	18	Klaxon...	Harvard... All
Single...	6-8	15	*4-8	4	6-8	4	6-8	2	A. C.	7/8	18	Ecco...	Hatfield... A
Single...	6-8	15	*6-8	12	6-8	2	6-8	2	A. C.	7/8	18	Klaxon...	Haynes... 47
Single...	6-8	15											H. C. S. Special...
Single...	6-8	15	6	4	3-4	2	3-4	2	A. C.	7/8	18	Sparton...	Hollier... 206-B
Double...	12-16	21			6-8	2	6-8	2	Bethlehem...	7/8	18	Klaxon...	Holmes...
Single...	6-8	15	6-8	4	3-4	2	*3-4	2	A. C.	7/8	18	Sparton...	Hudson Super Six...
Single...	6-8	15			6-8	2	6-8	2		7/8	18	Huffman...	Hupmobile... R
Single...	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Trojan...	
Single...	6-8	15	6-8	4	3-4	2	3-4	2	A. C.	7/8	18	Stewart...	Jackson... 6-38
Double...	6-8	15	*6-8	4	s6-8	2	s6-8	2	Champion...	7/8	18	Newtone...	Jones...
Single...	6-8	18	*6-8	4	6-8	3	6-8	3	A. C.	7/8	18	Sparton...	Jordan... F
Single...	6-8	18	6-8	4	6-8	3	6-8	3	A. C. & Rajah	7/8	18	Sparton...	Jordan... M
Single...	6	50	6	30	6	2	6	2	Rajah...	7/8	18	Sparton...	Kenworthy... 4-80
Single...	6-8	21	6		6-8	2	6-8	2	A. C.	7/8	18	Sparton...	Kenworthy... 6-55
Single...	6-8	15	*6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Sparton...	King... 8
Double...	6-8	18			d6-8	2	d6-8	2	A. C.	7/8	18	Sparton...	Kissel...
Single...	6-8	15			6-8	2	d6-8	2	Champion...	7/8	18	Klaxon...	Kline... 6-55-J
Single...	6-8	21	6-8	4	3-4	2	3-4	2	A. C.	7/8	18	Klaxon...	LaFayette...
Single...	6-8	32	6-8	5	6-8	2	6-8	2	Champion...	7/8	18	Klaxon...	Leach...
Single...	6-8	21	6-8	4	6-8	2	d6-8	4	Bethlehem...	7/8	18	E. A. L.	Lexington... S-20
Single...	6-8	15	*6-8	4	6-8	2	d6-8	2	A. C.	7/8	15	United...	Liberty... 10 C
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Titan...	7/8	18	Klaxon...	Locomobile... 48-6-7
Single...	6-8	17			6-8	2	6-8	2	A. C.	7/8	18	Schwarze...	Lorraine...

Battery: Prest-O-Lite, Prest-O-Lite. Wiring system: G, Generator and Ignition combined; GIM, Generator, Ignition, Motor combined; S, Generator, Motor Ignition combined; GM, Generator and Motor combined. Fuses: GT, Glass Tube; Cart, Cartridge; C. B., Circuit Breaker. Lamps: *Dashlights in series with taillights; headlight contains sidelight; d, double contact; s, single contact.

Specifications of the Electrical Equipment Found on 1920 Passenger Cars

Make and Model		IGNITION		GENERATOR		MOTOR	BATTERY				Wiring Sys-tem	Units Com-bined	FUSES			
		Sys-tem	Make	Control	Make		Volt-age	Make	Volt-age	Make			Amp. Hr.	Volt-age	Type	Volts
Maibohm	B	Single	At-Kent.	Hand	Bijur.	6	Bijur.	6	Willard.	90	6	1	S.	2-A.	6	20
Marmon	34	Single	Delco	Auto.	Delco.	6	Delco	6	Willard.	153	6	1	GI.			
Maxwell	25	Single	At-Kent.	Hand		6		6	Prest-O-L.	87½	6	1	S.	3A.	6	20
McFarlan	127	Double	Opt.	Hand	West.	6	West.	6	Willard.	132	6	1	GI.	5 A. G.	6	
Mercer	Ser. 5	Single	Eisemann.	Hand	West.	6	West.	6	Willard.	153	6	1	S.	Cart.		10
Meteor	KR	Single	Simms	Hand	West.	6	West.	6	Willard.	118	6	1		5 A. G.	6	10
Metz, Master Six		Single	Conn.	Hand	West.	6	West.	6	Willard.	111	6	1				
Mitchell	F-40	Single	Remy	Hand	Remy	6	Remy	6	Willard.	90	6	1	GI.	GT.	6	10
Monitor		Single	Conn.	Hand	Dyneto.	6	Dyneto.	6	Prest-O-L.	110	6	1				
Moon	6-48	Single	Delco.	Auto.	Delco.	6	Delco	6	Exide	120	6	1	S.			
Moon	6-68	Single	Delco.	Auto.	Delco.	6	Delco	6	Exide	120	6	1	S.			
Moore	F	Single	Conn.	Hand	A-L.	6	A-L.	6	Willard.	90	6	2				
Nash		Single	Wagner	H & A.	Delco.	6	Wagner	6	Willard.	111	6	1	S.			
National	Series BB	Single	Delco	H & A.	West.	6	West.	6	Prest-O-L.	110	6	1	S.	GT.	6-8	5
Nelson	D	Single	Bosch	Hand	U. S. L.	12	U. S. L.	12	Willard.	69	12	2	S.	G.	12	5-30
Noma	1-B	Single	Delco	Hand	Delco.	6	Delco	6	Willard.	90	6					
Norwalk	4-30KS	Single	Delco	Hand	Dyneto	6	Dyneto	6	Willard.	80	6	1			6	
Oakland	34-B	Single	Remy	Hand	Remy	6-8	Remy	6	Prest-O-L.	100	6-8	1	GI.			
Ogren	6-60	Single	Bosch	Hand	West.	6	West.	6	Willard.	111	6	1		Cart.	6	10
Oldsmobile	37-A	Single	Remy	Hand	Remy	6	Remy	6	Willard.	80	6	1				
Oldsmobile	45-B	Single	Delco	H & A.	Delco.	6	Delco	6	Willard.	90	6	1				
Olympian	45	Single	Conn.	Hand	A-L.	6	A-L.	6	U. S. L.		6					
Overland	4	Single	Conn.	Hand	A-L.	6-8	A-L.	6	U. S. L.	80	6-8	1	GI.	Glass.	6	20
Packard Single Six		Single	Delco	H & A.	At-Kent.	6	At-Kent.	6			6-8		S.		6	
Packard Twin Six		Single	Delco	H & A.	Bijur.	6	Bijur.	6	Willard.	134	6	1	S.	GT.	6	10
Paige	All	Single	At-Kent.	H & A.	G & D.	6	G & D.	6	Willard.	111	6	1	S.	G.		20
Pan-American	All	Single	West.	Hand	West.	6	West.	6	Willard.	111	6	1	S.	G.	6	
Paterson	6-50	Dual	Delco	Hand	Delco.	6	Delco	6	Willard.	90	6	1				
Peerless	Ser. 6	Single	At-Kent.	H & A.	A-L.	6	A-L.	6	Willard.	125	6	1		GT.	6	10
Piedmont	4-30	Single	Delco	Hand	Dyneto.	6	Dyneto.	6	Willard.	90	6	1	S.			
Piedmont	6-40	Single	Remy	Hand	Remy	6	Remy	6	Willard.	90	6	1	S.			
Pierce-Arrow	38&48	Double	Delco	H & A.	West.	6-8	West.	6	Willard.	153	6	1	S.	GT.	6-8	10
Pilot	6-45	Dual	Delco	Hand	Delco.	6	Delco.	6	Prest-O-L.	80	6	1	GI.			
Porter	46	Dual	Berling	Hand	West.	12	West.	12	Prest-O-L.	118	12	1	S.	Cart.	12	15
Premier	6-D	Single	Delco	Hand	Delco.	6	Delco	6	Willard.	111	6	1	S.			
Premo Car, 4-30&6-40			Conn.		Dyneto	6	Dyneto	6	Willard.		6	1				
Ranger	A	Single	Conn.	Hand	Bijur.	6	Bijur.	6	U. S. L.	80	6	1	S.	GT.	6	16
Reo	T & U	Single	Remy	Hand	Remy	6	Remy	6	Willard.	111	6	2	GI.	Wire.	6	5
Reo	T 6& U6	Single	North East	Hand	North East	6	North East	6	Willard.	111	6	1	S.	Wire.	6	6
Revere		Single	Bosch.	Hand	West.	6	West.	6	Willard.	153	6	1	S.	GT.	6	15
Roamer	6-54E	Single	Bosch.	Hand	Bijur	6	Bijur	6	Columbia.	117	6	1	S.	3A.	6	15
Roamer	4-75E	Single	Bosch.	Hand	West.	6	West.	6	Columbia.	117	6	1	S.	5 A. G.	6	15
R & V Knight	J & R	Single	Wagner	Hand	Wagner	6	Wagner	6	Willard.	111	6	1	S.	Cart.	250	20
Saxon	125	Single	Remy	Hand	Wagner	6	Wagner	6	Prest-O-L.	80	6	1	S.	Cart.	6-8	15
Sayers	C.P.	Single	Delco	Hand	Delco	6	Delco	6	Willard.	90	6	1	GI.	C.B.		
Scripps-Booth	B	Single	Remy	Hand	Remy	6	Remy	6	Prest-O-L.	85	6	1	GI.	GT.	6	20
Seneca	L	Single	Conn.	Hand	Allis Chalm.	6	Allis Chalm	6	Prest-O-L.	88	6	1	GM.			
Severin	H	Single	Wagner	Hand	Wagner	6	Wagner	6	Campbell	110	6	1	None.	Cart.	6	10
Singer	20	Single	Philbrin.	Hand	West.	6-8	West.	6	Willard.	153	6	1	S.	G. C.	6	15-20
Skelton	35	Single	Conn.	Hand	West.	6	West.	6	Prest-O-L.	85	6	1	S.		6	10
Spacke	8-20															
Standard	8-I	Double	Dixie	Hand	West.	6	West.	6	Willard.	153	6	1	S.W.	2-A.	6	15
Stanley	735															
Stanwood	A	Single	At-Kent.	Hand	West.	6	West.	6	Willard.	153	6	1	S.	Cart.	6	10
Stearns	SKL-4	Single	At-Kent.	Hand	West.	12	West.	12	Willard.	69	12	1	S.	Cart.	12	20
Stephens	80	Single	Conn.	Hand	A-L.	6	A-L.	6	U. S. L.	116	6	1	S.	Cart.	6	20
Stevens-Duryea	E	Double	Berling	Hand	West.	6-8	West.	6-8	Vester	120	6-8	1	S.	Cart.	6	15
Studebaker	All	Single	Wagner	Hand	Wagner	6	Wagner	6	Willard.	111	6-8	1	S.	Cart.	6	10
Stutz	H	Double		Hand	Remy	6	Remy	6	Willard.	132	12	1				
Templar	445	Single	Simms	Hand	Bijur.	6	Bijur	6	Prest-O-L.	100	6	1	S.	Cart.	6	20
Texan	B-38&A-38	Single	Conn.	Hand	Bijur	6	Bijur	6	Prest-O-L.	80	6	1	S.	Cart.	6	20
Tulsa	E-1,2,3	Single	Conn.	Hand	Dyneto.	6	Dyneto.	6	Exide	90	6	1	S.	GT.	6	15
Velie	34	Single	At-Kent	S. A.	West.	6	West.	6	Willard.	108	6	1	S.	Wire.		15
Velie	48	Single	At-Kent	S. A.	Bijur.	6	Bijur.	6	Willard.	111	6	1	S.	Wire.		15
Vogue	6-55 & 6-66	Single	Conn.	Hand	A-L.	6	A-L.	6	Willard.	111	6	1		Cart.	1-250	15
Wasp		Single	Bosch	Hand	West.	6	West.	6	Exide	135	6	1	S.	Cart.	6	20
Westcott	C-38&C-48	Single	Delco	H & A.	Delco.	6	Delco.	6	Willard.	111	6	1	S.	CB		
Willys-Knight	20	Single	Conn.	Hand	A-L.	6-8	A-L.	6	U. S. L.	170	6	1	GI.	GT.	6	20
Winton Six	24	Single	Bosch	Hand	Bijur.	6	Bijur	6	Willard.	132	6		S.	GT.	6	15
Winton Six	25	Single	Bosch	Hand	Bijur	6	Bijur	6	Willard.	125	6	1	S.	CB		
Winther	61	Single	West.	Hand	West.	6	West.	6	Willard.	111	6		S.	GI.	6	10

ABBREVIATIONS: *Starting and Lighting in closed models only. Ignition: At-K, Atwater-Kent; Conn., Connecticut; West, Westinghouse; Auto, Automatic; H & A, Hand and Automatic; S. A., Semi-Automatic. Generator: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; Ward-L, Ward-Leonard; N. E., North East; Split, Splitdorf. Motor: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; West, Westinghouse.

Giving Ignition, Starting, Lighting, Battery, Lamp, Spark Plug and Horn Data

LAMP CANDLEPOWER, VOLTAGE AND TYPE OF BASE										SPARK PLUGS			Horn	Make and Model
Amp.	Base Contact	HEADLIGHTS		SIDELIGHTS		TAILLIGHTS		DASHLIGHT		Make	Diam. Inches	Thread Pitch		
		Volts	CP.	Volts	CP.	Volts	CP.	Volts	CP.					
20	Single.	6-8	20	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Schwarze	Maibohm.....B
	Single.	6-8	27	*6-8	8	6-8	2	6-8	2	A. C.	7/8	18	Sparton	Marmon.....34
20	Single.	6-8	15			6-8	2	6-8	2	Champion	7/8	18	Schwarze	Maxwell.....25
	Single.	6-8	21	*6-8	12	6-8	2	d6-8	2	A. C.	7/8	18	Klaxon	McFarlan.....127
10	Single.	6-8	20	6-8	5	6-8	2	6-8	4	Champion	7/8	18	Sparton	Mercer.....Ser. 5
10	Single.	6-8		6-8		6-8		6-8		A. C.				Meteor.....K R
	Single.	6-8	16	6-8	4	6-8	2	6-8	2	Champion	7/8	18	Trojan	Metz, Master Six.....
10	Single.	6-8	21	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Sparton	Mitchell.....F-40
	Single.									Champion	7/8	18	Klaxon	Monitor.....
	Single.	6-8	20			6-8	2	d6-8	2	Champion	7/8	18	Klaxon	Moon.....6-48
	Single.	6-8	20			6-8	2	d6-8	2	Champion	7/8	18	Klaxon	Moon.....6-68
	Single.	6	20	6-8		6-8	2			Champion	7/8	18	Garford	Moore.....F
	Single.	6-8	15	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Trojan	Nash.....
5	Double.	12-16	15	*6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Sparton	National.....Series BB
5-30	Double.	12-16	15	12-16	4	12-16	2	12-16	2	Champion	18 m.m.		Schwarze	Nelson.....D
	Single.	6-8				6-8		d6-8						Noma.....1-B
	Single.	6-8	17			6	2	6	2	Champion	7/8	8	Stewart	Norwalk.....4-30. KS
	Single.	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Schwarze	Oakland.....34-B
10	Single.	6	32	6		6	4	6	4	Champion	7/8	18	Klaxon	Ogren.....6-60
	Single.	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Oldsmobile...37-A
	Single.	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Oldsmobile...45-B
	Single.									Champion			E. A. Lab.	Olympian.....45
20	Single.	6-8	16			3-4	2	*3-4	2	Champion	1/2		A. L.	Overland.....4
	Single.	6-8		6-8	4	6-8	2	6-8	2		7/8	18		Packard Single Six.....
10	Single.	6-8	21	*6-8	4	6-8	2	6-8	4	A. C.	7/8	18	Sparton	Packard Twin Six.....
20	Single.	6-8	17	6-8	4	6-8	2	6-8	2	A. C.	7/8	18		Paige.....All
	Single.	6-8	32			6-8	2	*3-4	4	A. C.	7/8	18	E. A. Lab.	Pan-American...All
	Single.	6-8	15	6-8	4	6-8	2	6-8	2	A. C.			E. A. Lab.	Paterson.....6-50
10	Single.	6-8	21	6-8	4	6-8	2	6-8	2	Champion	7/8	18	Sparton	Peerless.....Ser. 6
	Single.	6-8	12			6	2	6	2	Champion	7/8	18	Klaxon	Piedmont.....4-30
	Single.	6-8	12			6	2	6	2	Champion	7/8	18	Klaxon	Piedmont.....6-40
10	Single.	6-8	20			6-8	5	6-8	5	A. C.	7/8	18	Klaxon	Pierce-Arrow...38&48
	Single.	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Schwarze	Pilot.....6-45
15	Single.	12-16	20	12-16	4	12-16	4	12-16	2	A. C.		18	Stewart	Porter.....46
	Double.	6-8	21	*6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Klaxon	Premier.....6
										Bethlehem	7/8	18	Klaxon	Premo Car, 4-30&6-40
16	Single.	6-8	15	6-8	4	6-8	2	6-8	2	Champion	7/8	18	Stewart	Ranger.....A
5	Double.	7	15			3-4	2	*3-4	2	A. C.	1/2	18	Trojan	Reo.....T & U
6	Single.	7	15			6	2	6	2	A. C.	1/2	18	North East	Reo.....T6 & U6
15	Single.	6-8	20	*6-8	8	6-8	4	6-8	4	Optional	7/8	18	Klaxon	Revere.....
15	Single.	6-8	15	6-8	8	6-8	2	6-8	2	A. C.	7/8	18	Sparton	Roamer.....6-54E
15	Single.	6-8	15	6-8	8	6-8	2	6-8	2	A. C.	7/8	18	Sparton	Roamer.....4-75E
20	Single.	6-8	15	6-8	4	6-8	2	d6-8	4	A. C.	7/8	18	Klaxon	R & V Knight, J. & R.
15	Single.	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Trojan	Saxon.....125
	Single.	6-8	15			6-8	2	d6-8	2	Champion	7/8	18	Stewart	Sayers.....C. P.
20	Single.	6-8	18			6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Scripps-Booth...B
20	Single.	6-8	15	6-8	2	6-8	2	d6-8	2	Champion	7/8	18	Klaxon	Seneca.....L
10	Double.	6	17	6	5	6	2	6	2	Champion	7/8	18	Klaxon	Severin.....H
15-20	Single.	6-8	15			6-8	2	d6-8	2	A. C.	7/8	18	Klaxon	Singer.....20
10	Single.	6	18			6	2	6	2	Bethlehem	7/8	18	Klaxon	Skelton.....35
													Spacke	8-20
15	Single.	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Standard.....8-1
20	Double.	6-8	21	6-8	4	6-8	2	6-8	2				Klaxon	Stanley.....735
10	Single.	6	17	6	10	6	7	6-8	2	A. C.	7/8	18	Klaxon	Stanwood.....A
20	Single.	12-16	21	*12-16	4	12-16	2	12-16	2	A. C.	7/8	18	B. & A. Lab.	Stearns.....SKL-4
20	Single.	6-8	15	6-8	2	6-8	2	6-8	2	Champion	7/8	18	Klaxon	Stevens.....80
15	Single.	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Stevens-Duryea...E
10	Single.	6-8	12			6-8	2	6-8	2	Champion	1/2		Sparton	Studebaker...All
	Double.	6-8	15	*6-8	4	6-8	2	6-8	2	A. C.			Klaxon	Stutz.....H
20	Single.	6-8	21	*6-8	4	6-8	2	6-8	2	Champion	7/8		Klaxon	Templar.....445
20	Single.	6	16			6	2	6-8	2	A. C.	7/8	18	Klaxon	Texas.....B38&A38
15	Single.	6-8	21	6-8	2	6-8	2	d6-8	2	Champion	7/8	18	Trojan	Tulsa.....E-1,2,3
15	Single.	6-8	15	6-8	4	6-8	2	d6-8	2	Champion	7/8	18	E. A. Lab.	Velie.....34
15	Single.	6-8	15	6-8	4	6-8	4	d6-8	4	Champion	7/8	18	Sparton	Velie.....48
15	Single.	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Vogue.....6-55 & 6-66
20	Single.	6-8	18	*6-8	4	3-4	2	d3-4	2	A. C.	7/8	18		Wasp.....
20	Single.	6-8	30			3-4	2	*3-4	2	Champion			Klaxon	Westcott...C-38&C-48
15	Single.	6-8	21	6-8	6	6-8	2	6-8	2	Champion	7/8	18	Sparton	Willys-Knight...20
	Single.	6-8	21	6-8	6	6-8	2	6-8	2	Champion	7/8	18	American	Winton Six.....24
10	Single.	6	18			6	4	6	2	Champion	7/8	18	Electric	Winton Six.....25
	Single.									A. C.	7/8	18	Klaxon	Winther.....61

Battery: Prest-O-Lite, Prest-O-Lite. Wiring system: GI, Generator and Ignition combined; GIM, Generator, Ignition, Motor combined; S, Generator, Motor Ignition separate; GM, Generator and Motor combined. Fuses: GT, Glass Tube; Cart, Cartridge; C. B., Circuit Breaker. Lamps: *Dashlights in series with taillights; headlight contains sidelight; d,—double contact; s,—single contact.

From the Four Winds

Glimpses at the World of Motordom

COMING MOTOR EVENTS

Automobile Shows

Atlanta, Ga.	Automobile Show	Oct. 16-26
Long Beach, N. J.	Annual Automobile Show	Oct. 30-Nov. 4
New York	Automobile Salon	Nov. 14-21
Chicago	Automotive Equipment Show	Nov. 15-20
Jersey City, N. J.	Annual Automobile Show	Nov. 15-20
Jacksonville, Fla.	Annual Automobile Show	Nov. 18-27
Houston, Texas	Automobile Show	Nov. 20-28
Los Angeles, Cal.	Motor Show	Jan. 7, 1921
New York	National Passenger Car Show	Jan. 8-15, 1921
Milwaukee	Annual Winter Show	Jan. 14-21, 1921
Schenectady, N. Y.	Annual Automobile Show	Jan. 16-22, 1921
Montreal	Nat'l Motor Show of Eastern Canada	Jan. 22-29, 1921
Amsterdam, N. Y.	Annual Automobile Show	Jan. 23-29, 1921
Chicago	National Passenger Car Show	Jan. 29-Feb. 4, 1921
Hudson, N. Y.	Annual Automobile Show	Jan. 30-Feb. 5, 1921
Minneapolis	Winter Show	Feb. 5-12, 1921
Newberg, N. Y.	Annual Automobile Show	Feb. 6-12, 1921
Kansas City, Mo.	Annual Automobile Show	Feb. 12-19, 1921
Pittsfield, Mass.	Annual Automobile Show	Feb. 20-26, 1921
Deadwood, S. D.	Annual Automobile Show	Feb. 21-26, 1921

Tractor Shows

Columbus, O.	Annual Automobile Show	Mar. 20-26, 1921
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Foreign Shows

Christchurch, N. Z.	Passenger Car Show, Olympia	Nov. 4-13
Brussels	Olympia Motor Exhibition	Nov. 6-13
Sydney, Australia	Automobile Show	Dec. 10
London	National Tractor Show	Feb. 6-12, 1921

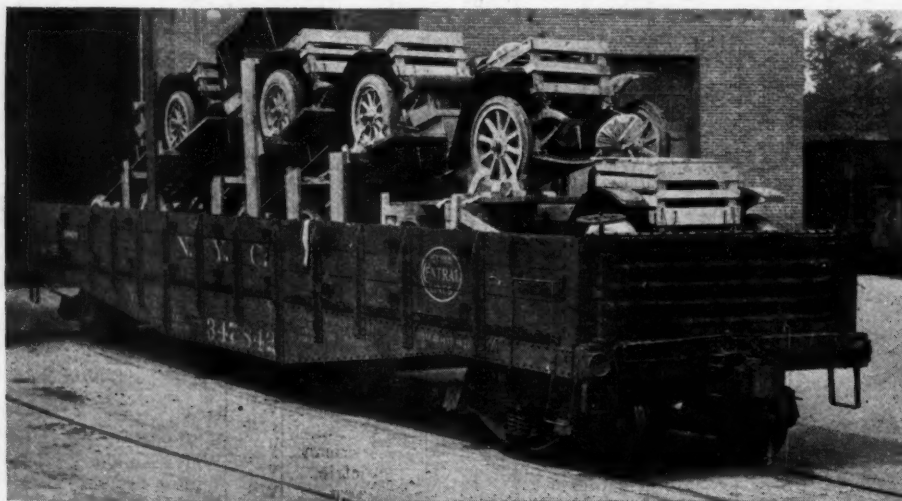
Races

Cleveland	Dirt Track	Nov. 25
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Conventions

Salina, Kan.	Auto Trades Assn' of Kansas, Annual Convention	Oct. 20
Atlantic City	National Implement and Vehicle Association Twenty-seventh Annual Convention	Oct. 20-21-22
Indianapolis	Indiana Automotive Dealers' Assn.	Nov. 4-5
Cleveland	Service Managers' Convention	Nov. 9-11
Chicago	Automotive Equipment Assn.	Nov. 15-20
Cincinnati	Ohio Automobile Trade Assn. Fourth Annual Convention	Dec. 8-10
Cincinnati	Annual Convention Ohio Automobile Jobbers' Assn.	Dec. 8-9
Columbia, S. C.	Annual Meeting South Carolina Automotive Trade Assn.	Dec. 9-10
Milwaukee	Wisconsin Automotive Dealers' Assn.	Jan. 19, 1921
Chicago	N. A. D. A. Annual Meeting	Jan. 31-Feb. 1, 1921

Necessity as a Teacher of Efficiency



To glance casually at an open freight car one would never think that five big trucks could be packed into it, but as evidenced above, the White Co., Cleveland, does it very neatly

BUSINESS NOTES

The Pyrene Mfg. Co., Inc., has brought an action for infringement against the Fire Gun Mfg. Co. on U. S. Patent to Pearson No. 1194781 issued Aug. 15, 1916.

Motor Products, Inc., Milwaukee, distributor of the Republic truck, has changed its corporate name to the Perego-Clarkson Co.

The Stevens-Duryea & Case Car Co., Milwaukee, formerly the Magnetic Motors Corp., has changed its corporate style to Kent-Hustis, Inc. It is the distributor of the Stevens-Duryea and Case in the Wisconsin territory.

E. L. Cord, Milwaukee, has been appointed distributor of the Moon in Wisconsin and Upper Michigan.

The Randall Republic Co. announces its removal to 53-55 Second East Street, Salt Lake City.

The McClaren Rubber Co., manufacturers of the McClaren Autocrat Cord and Allroad fabric tires, have appointed the J. D. Bowen Co., Jacksonville, distributors for Florida.

The Harry Starkie Auto Co., New Britain, Conn., has taken on the representation of the Giant dry rechargeable storage battery for Hartford county, Conn., and will open a sales and service station in Hartford. The company has the Chevrolet in New Britain.

The Mitchell-Lewis-Staver Co., with sales offices in Portland and Seattle, has been appointed Briscoe distributors for Washington and Oregon.

The Continental Tire & Rubber Co.'s new \$500,000 plant at Gulfport, Miss., for the manufacture of fabric tires, will be ready for operation by the end of November, according to George Wood, general manager, who is here installing machinery. Rubber will be brought direct to Gulfport from Brazil, and Mississippi cotton will be used in the construction of the tires. This is the first tire factory to be established in the Gulf Coast states. It will have a capacity of 500 tires a day.

The Prestolite Co., a subsidiary of the \$70,000,000 Union Carbide & Carbon Co. of New York, has commenced the erection of an acetylene gas manufacturing plant just outside the limits of New Orleans. The Linde Air Products Co., also a subsidiary of the Union company, has also commenced work on an oxygen-producing plant in New Orleans.

The Southern Motor Manufacturing Co., Ltd., will be producing its own malleable and gray iron for its various parts and products by Jan. 1 at the permanent Ranger plant in Houston, Texas.

The Wisconsin Roamer Co. has been organized at Milwaukee to act as distributor of the Roamer in Wisconsin and northern Michigan.

The Monroe Tire Corp., factory distributor and jobber of tires, tubes and sundries, is one of the new arrivals on automobile row, Chicago. The president is Harold J. Samuels, who was formerly secretary of the World Tire Corp., and the vice president and treasurer is Leroy Eschner, former sales manager for the World company.

The Equitable Motor Truck Co., New York City, has been selected as Eastern distributors for Ace motor trucks. E. Leindorf, recently retail sales manager of the Rainier Motor Corp., New York, is president and general manager of the company; A. H. Mollenhauer, sales manager; and Leonce Raboin in charge of service.

Ned J. Hammer, for many years connected with the California Oakland Motor Co., has been promoted to the position of assistant San Francisco branch manager.